Architectural
Library

THE ARCHITECTURAL RECORD

1934

8

TRADE SCHOOLS • SCHOOL PROJECTS • FIELD BUILDING

FIREPROOF PLANK* HANDLES LIKE WOOD

Gypsteel Gypsum Floors and Roofs save 7 ways

Think of it! A fireproof Plank that handles like lumber. Can be cut, nailed, sawed or bored. And saves you time and money on floors, roofs, ceilings, partitions, and sheathing.

WHAT IT IS. This new gypsum development is called *Gypsteel Gypsum Plank*. It's a solid slab of factory-cast, dense gypsum, tongued and grooved on sides and ends with galvanized copper-bearing steel. Light, strong, incombustible. Eliminates water. Requires no form work. Lowers heating costs. And it's vermin-proof and termite-proof as well! Endorsed by leading architects and industrial concerns.

FREE BULLETIN

Read the 7 major features listed below. Then write today for our free bulletin, giving full details on this Plank, together with valuable information on floor loads, acoustics, termites and other architectural matters. Structural Gypsum Corporation, 30 Rockefeller Plaza, New York.

7 time-saving and money-saving features

1. **SIMPLIFIES PLANNING.** No detailed specifications needed, as in the case of the usual made-to-order materials.
2. **EASY TO USE.** Light, dry, clean. Can be cut, sawed, nailed or bored as readily as lumber.
3. **SPEEDS CONSTRUCTION.** Eliminates form work. Always ready to use; requires no special framing.
4. **FIRE-RESISTIVE.** Lowers insurance costs on completed structures as well as on work under construction.
5. **ELIMINATES WATER.** Provides long life. Minimizes trouble. Speeds up work in any weather.
6. **SPECIAL FEATURES.** (a) Insulated: lowers heating costs. (b) Sound-absorbing: new Acoustical Plank now available for roof-ceiling construction. (c) Extra durable; will not rot, shrink or warp; is absolutely incombustible, vermin-proof and termite-proof.
7. **ALWAYS AVAILABLE.** Standard sizes, uniform quality.

GYPSTEEL PLANK GYPSUM

Trade-Mark

U. S. Pat. No. 1,854,396 Canadian Pat. No. 328,519
Other U. S. and Foreign Patents Pending

**The term PLANK as applied to cementitious building products is a registered trade-mark of the Structural Gypsum Corporation.*

THE ARCHITECTURAL RECORD

VOLUME 76 NUMBER 2 1934 AUGUST

ILLUSTRATED NEWS 71–75

VISUAL EDUCATION AT NEWARK, N. J., PUBLIC SCHOOL OF FINE AND INDUSTRIAL ART Frontispiece

NEW SCHOOLS ARE NEEDED. By C. Theodore Larson 77–81

VOCATIONAL SCHOOLS. By James O. Betelle, Architect 82–88

PORTFOLIO OF SCHOOL BUILDINGS

Roxbury Latin School, Roxbury, Massachusetts—Perry, Shaw and Hepburn, Architects • Dexter School at Brookline, Massachusetts—Perry, Shaw and Hepburn, Architects • Woodrow Wilson Grade School, Westfield, New Jersey—Coffin and Coffin, Architects • Benjamin Franklin Grade School, Westfield, New Jersey—Coffin and Coffin, Architects • South Mountain Estates Elementary School, Millburn, New Jersey—Ernest Sibley, Architect; George M. Cady, Associate • Gymnasium for Men, University of California, Berkeley, California—George W. Kelham, Architect • University of Rochester, New York—Gordon & Kaelber, Architects • Auburn Senior High School, Auburn, New York—Hillger and Beardsley, Architects • Theodore Roosevelt Junior High School, Peoria, Illinois—Hewitt, Emerson & Gregg, Architects • Proposed Development of Wentworth Institute, Boston, Massachusetts—Kilham, Hopkins and Greeley, Architects • School and Recreational Facilities, Marshall Field Apartments, Chicago, Illinois 89–112

WAS THE HOME INSURANCE BUILDING IN CHICAGO THE FIRST SKYSCRAPER OF SKELETON CONSTRUCTION?
REPORT OF THE INVESTIGATING COMMITTEE 113–118

NEITHER A SKYSCRAPER NOR OF SKELETON CONSTRUCTION—Irving K. Pond's Objection 118
32 (adv.)

THE FIELD BUILDING, CHICAGO. Graham, Anderson, Probst and White, Architects 119–128

PHOTOMURALS IN NBC STUDIOS, R. C. A. BUILDING, RADIO CITY, NEW YORK. Photographs by Margaret Bourke-White 129–138

TECHNICAL NEWS AND RESEARCH:

WHEN BIDS AND BUDGET DO NOT BALANCE. REDUCING CONSTRUCTION COSTS. PART II. By Harold R. Sleeper, Architect, Office of Frederick L. Ackerman 139–144

BUILDING TRENDS AND OUTLOOK. By L. Seth Schnitman, Chief Statistician, F. W. Dodge Corporation 31, 32, 35 (adv.)

THE ARCHITECT'S LIBRARY 21, 22 (adv.)

M. A. MIKKELSEN
Editor

A. LAWRENCE KOCHER
Managing Editor

C. THEODORE LARSON
Technical News Editor

JOHN M. WILLIAMS
General Manager

J. A. OAKLEY
Business Manager

F. H. COMTOIS

ERNEST BORN
PRENTICE DUELL
HOWARD T. FISHER
FISKE KIMBALL
WILLIAM STANLEY PARKER
Contributing Editors

Published monthly by F. W. DODGE CORPORATION, 115-119 West 40th Street, New York. Truman S. Morgan, President; Sanford D. Stockton, Jr., Secretary; Howard J. Barringer, Treasurer. Yearly subscription: United States and Possessions, $3.00; Canada and Foreign, $5.00; Single Copy, 50c. Member Audit Bureau of Circulations and Associated Business Papers, Incorporated.

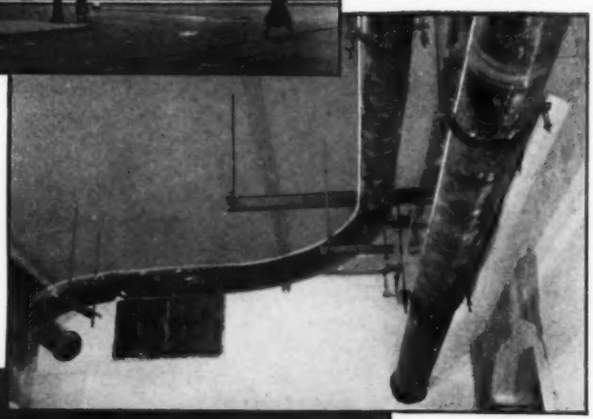
Copyright, 1934, by F. W. Dodge Corporation. All rights reserved.

Entered as second class matter May 22, 1902, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U.S.A.

Another AIRCOWELDED piping job

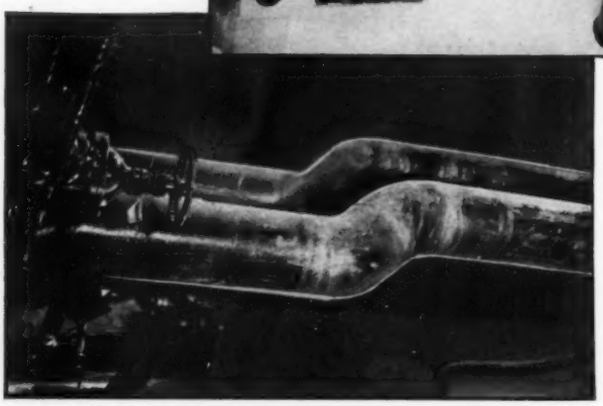
Heating and power piping in this big office building . . .

Adding boiler capacity and a complete power plant constituted the project recently carried through at 11 Broadway. For this new heating and power service designed for 165 lb., *extra heavy pipe* was used. Speed was an important factor on the project and its accomplishment was materially aided by the inherent time-saving advantage of the AIRCOWELDING process. AIRCOWELDING was used throughout, as well as AIRCO oxygen, acetylene, welding apparatus and supplies.



AIRCOWELDED 8" and 12" main steam lines entering engine room. Note long sweeping bends, a power-saving advantage of welded piping.

The project was planned by Robert V. Blodget, Architect and Consultant, of 11 Broadway. And right through the job AIRCO rendered its customary full and efficient cooperation.



Another view of the AIRCOWELDED 8" and 12" main steam lines to engines. Extra heavy pipe was used throughout.

WRITE for this new EVIDENCE bulletin

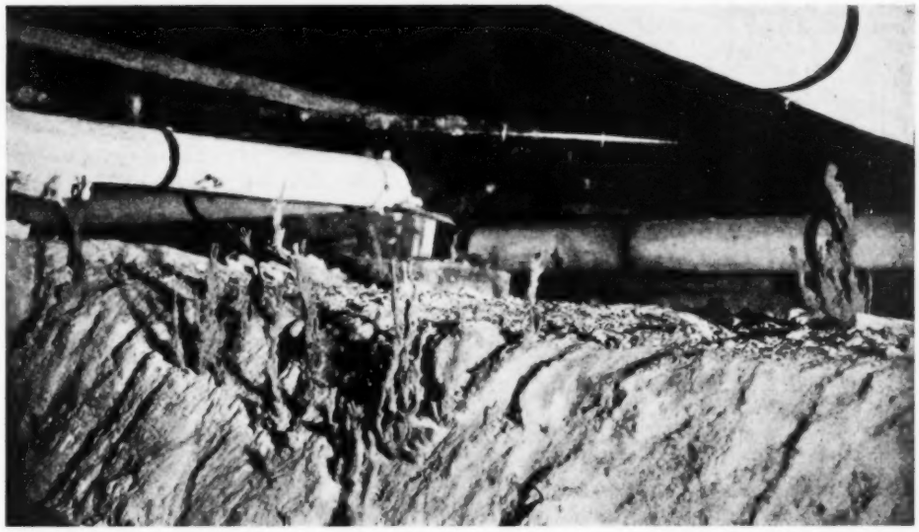
Definite evidence of the widespread use of AIRCOWELDING is presented by the representative oil, gasoline and natural gas lines and heating and power piping jobs illustrated and described in this bulletin. They show that AIRCOWELDING stands thoroughly tested and proved and its speed and economy firmly established. Write for your copy—today.

AIR REDUCTION SALES CO.

General Offices: 60 East 42nd St., New York, N. Y.
DISTRICT OFFICES and DISTRIBUTING STATIONS in PRINCIPAL CITIES

FOR SOUNDNESS and ECONOMY • • AIRCOWELD

Termites shun the light and live entirely shut off from the outside world. In their search for wood to eat, the subterranean termites build their dwellings in advance in the form of tiny tubes or covered runways made of thousands of particles of earth or wood cemented together by excretions of the termite. Each tiny particle is brought separately and put in place by a worker termite. Only the subterranean termites build these structures; the wood-dwelling termites are confined to the cavities which they excavate within the wood. Heat is favorable to such activities, and such towers are frequently found in furnace rooms or running up to furnace pipes, as in the photograph, and from there up to the floor shown.



From TERMITES AND TERMITE CONTROL

TERMITES AND TERMITE CONTROL. *A Report to the Termite Investigations Committee. Charles A. Kofoid, Editor-in-Chief. University of California Press, Berkeley, Calif.* 768 *pages.* 182 *figures and illustrations in text.* $5

In 1928 an appeal for funds was made with which to organize the work of the Termite Investigations Committee "to investigate the conditions as they exist in the region pertaining to termites, their action upon structures, the best means of protecting these structures against their attack, and to prepare progress reports as the work progresses." The published report is the result of this cooperative enterprise, the various chapters being contributed by well-known Pacific coast engineers, entomologists, zoologists, pathologists, biologists and chemists, as well as architect, building superintendent and lumber authorities.

The book is intended primarily for biologists, architects, engineers, contractors, building inspectors and users of wood, and is a complete discussion of the biology of termites, and an account of termites of the United States, Mexico, the Canal Zone, the West Indies, Hawaii, and the Philippine Islands, with recommendations for prevention and control of termite damage by methods of construction and the use of chemically treated and unpalatable woods.

Of principal interest to architects and engineers are the following chapters: In part I of the book, on termites and their biology; Chapter II. Colonization of the Common Dry-wood Termite in Wooden Structures, by P. A. Harvey, formerly Professor of Biology, Whitworth College, and Instructor in Biology, San Diego Teachers College, Field Biologist, Termite Investigations Committee. There follows an interesting chapter, 34, in Part II on chemical investigation, on Wood Preservatives and Protective Treatments, by Merle Randall and Thomas C. Doody, well-known chemist and chemical engineer. And a chapter, 48, prepared by four authorities, in Part IV, on prevention and repair of termite damage, and entitled, Buildings.

THE PLANNING AND CONSTRUCTION OF SCHOOL BUILDINGS. *National Society for the Study of Education. Thirty-third Yearbook, Part* 1. *Edited by Guy Montrose Whipple, Secretary of the Society. Public School Publishing Company: Bloomington, Ill.* 337 *pages.*

The material in this yearbook has practical value for both educators and architects; it will mean better school buildings for American youth. Chapters have been contributed by noted educators for each of the six main sections: (I) The Philosophy of the School Plant. (II) School-Plant Planning Policies. (III) Educational Services. (IV) Architectural Services. (V) Constructional Service. (VI) Financial Aspects of the Problem.

The object of the combined efforts of the authors is a school building with a location in the community that will represent the part that public education plays in the lives of individual citizens. Such a building must be planned to meet the broadest educational demands of the community to serve both childhood and adulthood.

POCKET COMPANION. *Information and tables for engineers and designers and other data pertaining to structural steel. Carnegie Steel Company, Carnegie Building, Pittsburgh, Pa.* 524 *pages. Diagrammatically illustrated.*

This twenty-fourth edition has been revised and enlarged. It contains the profiles and essential data for sections most suitable for all structural purposes, including bridge, building, car and ship construction. The sections have been grouped under the headings: "Regular," for which there is a constant demand and which can be procured readily from the mill; "Special," for which there is a fluctuating demand and infrequent rollings.

Diagrams and formulas are given of numerous sections, as well as elements and dimensions. The book contains a section on useful data on areas and weights of rectangular sections and rounds and squares, tolerances for structural shapes, and economy tables for CB sections. Every-day information is supplied by the tables on specific gravities and weights, strength of materials, expansion and contraction of bodies by changes in temperature, equivalents of measure, metric conversion tables, properties of the circle, area of plane figures, trigonometric formulas and solution of triangles, areas of circular sections and segments, functions of numbers, and so on.

Information in regard to securing this book may be obtained by writing to the Carnegie Steel Company at Pittsburgh, or to the nearest district office.

TOWARD FULLER LIVING THROUGH PUBLIC HOUSING AND LEISURE TIME ACTIVITIES. *By Abraham Goldfeld, Executive Director, Lavanburg Foundation, and Instructor in Housing, New School for Social Research. The National Public Housing Conference,* 112 *East* 19*th Street, New York City.* 56 *pages. Illustrated.* 25*c.*

This pamphlet is a study of the social, recreational and educational activities carried on in five of the better known housing projects in the New York metropolitan area. With emphasis by the New Deal on public housing and leisure time, new economic and social policies, this study seems opportune. The pamphlet points out that housing must include provisions for social, recreational and educational activities, and that people take advantage of such opportunities when facilities are provided.

The author, in his capacity of Executive Director of the Fred. L. Lavanburg Foundation, for the past six years has been the supervisor of the Lavanburg Homes, a low-cost housing project on the Lower East Side of New York City.

THE PHAROS OF ALEXANDRIA: SUMMARY OF AN ESSAY IN SPANISH BY DON MIGUEL DE ASIN. *Communicated by the Duke of Alba. Published by Humphrey Milford, London. Oxford University Press,* 114 *Fifth Avenue, New York City.* 18 *pages.* 4 *plates.* $1

Miguel Asin presents a résumé of a document written by the Arab scholar Ibn al-Sayj and published in Cairo in 1870, giving a detailed description of the Pharos of Alexandria, based upon the notes made by Ibn al-Sayj when he visited the Pharos and inspected its features from within and without, measuring the inaccessible heights geometrically. This document was unknown to Herman Thiersch when, in 1909, he wrote his well-known treatise on the Pharos. The various headings in which Ibn al-Sayj divided his chapters are: 1. Access to the Pharos; 2. Base of the Pharos; 3. General structure; 4. Apex or pinnacle; 5. Spiral slope, or staircase; 6. Chambers; 7. Table of metrical equivalents. Included in the booklet are notes by Don M. Lopez Otero, one of the leading architects of Spain and a member of the Spanish Academy of History, on the narrative of Ibn al-Sayj.

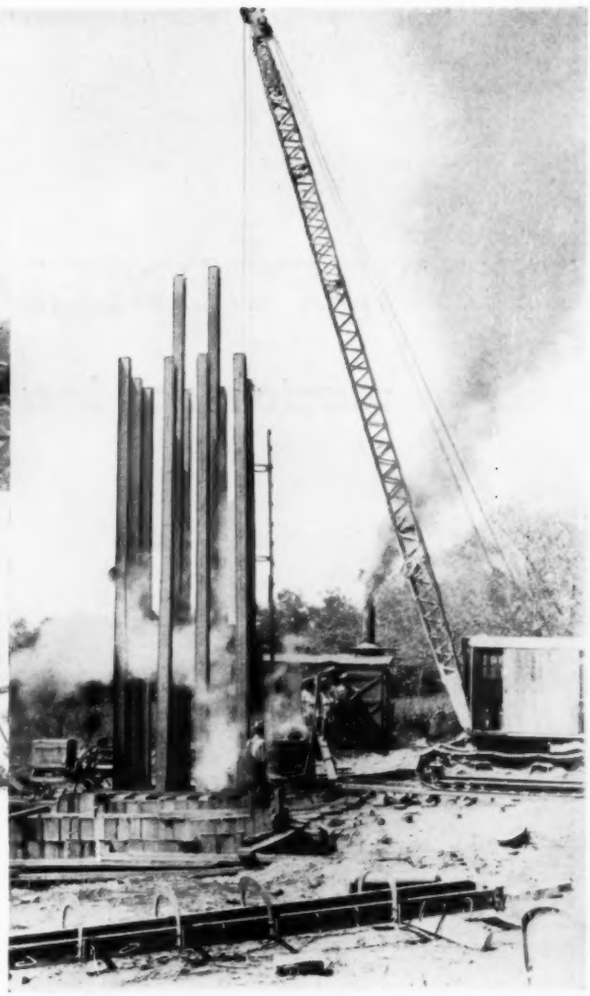
LANDSCAPE ARCHITECTURE. *A Classified Bibliography with an Author Index. Compiled in the Library of The Schools of Landscape Architecture and City Planning, Harvard University, by Katherine McNamara, Librarian. Harvard University School of Landscape Architecture, Cambridge, Mass.* 209 *pages. Pressboard bound,* $2; *cloth bound,* $2.50

The bibliography is issued in preliminary form with the hope and expectation of the cooperation of its users in supplying data for additions and revisions which may be incorporated later in a more permanent edition. The arrangement of the references follows the Landscape Architecture Classification Scheme of Henry Vincent Hubbard and Theodora Kimball, published by the Harvard University Press in 1920.

It has been the aim of the compiler to make as comprehensive as possible the list of books on landscape architecture. The literature of many allied subjects is included only in so far as it would be of considerable interest historically or of considerable use in a library of landscape architecture. Summary outline: Bibliography; Periodicals; Biography; History; General works, including essays and poetry; Landscape improvement and conservation of natural resources; Study and teaching; Theory of landscape design; Professional practice and technical procedure; Landscape Construction and Maintenance; Elements and materials in landscape and landscape design; Structures; Types of landscape design; Land subdivision and garden cities; City and regional planning and zoning. A complete author index is arranged at the back of the book.

● *Partially completed highway bridge near Leeper, Wayne County, Missouri, in which CB Sections were used as bearing piles.*

● *On the Leeper bridge, construction was facilitated by welding sills for the concrete cap to the tops of the steel bearing piles.*



● *Driving steel bearing piles for highway bridge at Hendrickson, Mo.*

A LONG WAY *to a solid bottom*

● **Under such conditions, CB SECTIONS are proving to be successful and economical as bearing piles. Bearing may be found with such piles well within substantial bottoms. For conditions where driving is hard, or where great lengths are needed, CB SECTIONS especially warrant investigation. Upon request, we will be glad to supply further information.**

CB SECTIONS

Illinois Steel Company

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

208 SOUTH LA SALLE STREET • CHICAGO, ILLINOIS

TRANSFORMED!

and the magic wand is a paint brush

Architect Francis Keally modernizes the Hotel Collingwood and gives his surfaces the charm that lasts

A GREAT WAVE of renovating sweeps the country. Architects knock down, tear out and reconstruct . . . give old exteriors new faces and shabby interiors a new deal.

Of the New York hotels that have recently changed face and form, one of the outstanding examples is the Collingwood on West 35th Street. The photographs above show how charmingly the main floor has been remodeled . . . transformed by Architect Francis Keally who planned and supervised the job.

The "before" and "after" pictures show that much of the charm comes from surfaces treated with paint. "When the architect accepts a commission," says Mr. Keally, "he assumes a real responsibility in reference to the expenditures of the owner. He must, therefore, ever keep before him the importance of using products which possess three factors: utility, beauty, durability. This applies to paint as well as everything else in the building."

Dutch Boy provides paint for every surface . . . and every finish

Dutch Boy White-Lead makes paint for wood, plaster, wall board, metal, brick, stucco and other surfaces.

Moreover it makes paint for finishes of every kind. Mixed with linseed oil it produces long-wearing gloss paints. Mixed with flatting oil it provides washable, tile-like flat and eggshell finishes . . . undercoatings for enamel . . . mottled, blended and textured effects. And by adding Dutch Boy Colors-in-Oil you can obtain any one of a thousand tints.

So plan your modernization with Dutch Boy in mind, whether it be for a hotel, a home or any other kind of a building. It offers not only utility, beauty and durability, but exceptional economy as well.

DUTCH BOY *All-Purpose Soft Paste* WHITE-LEAD

LINSEED OIL — FLATTING OIL — LIQUID DRIER — WALL PRIMER — COLORS-IN-OIL

NRA

NATIONAL LEAD COMPANY

111 Broadway, New York; 116 Oak Street, Buffalo; 900 W. 18th Street, Chicago; 659 Freeman Avenue, Cincinnati; 820 W. Superior Ave., Cleveland; 722 Chestnut Street, St. Louis; 2240 24th Street, San Francisco; National-Boston Lead Co., 800 Albany Street, Boston; National Lead & Oil Co. of Pa., 316 Fourth Avenue, Pittsburgh; John T. Lewis & Bros. Co., Widener Building Philadelphia.

CALENDAR OF EXHIBITIONS AND EVENTS

August 15-24	National Schoolmart and Schoolview, Port Authority Commerce Building, New York City.
October 15-November 15	Low-cost housing exhibit at New York Museum of Modern Art.
November 1	Closing date of the 1934 Century of Progress Exposition in Chicago.
Until December	Remodeling Competition, conducted by the Good Housekeeping Studio, 57th Street and Eighth Avenue, New York City.
December 3-8	Eleventh National Power Exposition, at Grand Central Palace, New York City.

NEWS OF THE FIELD

John C. B. Moore, architect, has moved his office to 11 East 44th Street, New York City.

Randolph Frantz and John M. Thompson announce the forming of a partnership for the general practice of architecture with offices in the Boxley Building, Roanoke, Virginia.

Francis P. Rooney, architect, has moved from 221 Auditorium Building to 209 Lindell Building, Spokane, Washington.

A low-cost housing exhibit will be held at the New York Museum of Modern Art between October 15 and November 15. American and European housing developments which meet the requirements of low rentals will be shown together with such evidence as has been made available in recent years which may be used in developing a foundation for a low-rental housing program in the United States. The exhibit is held under the auspices of the New York City Housing Authority, the Welfare Council of New York, the Lavanburg Foundation, and other agencies including the Museum of Modern Art. For information address Carol Aronovici, Chairman, 302 East 35 Street, or Mrs. Alice F. Rothblatt, Welfare Council, 122 East 22 Street, New York City.

The names of Dr. Frederick S. Dellenbaugh, Jr., as engineer, and Roswell S. Barratt, as architect, should have been included in the caption on the publication of Admiral Byrd's Antarctic hut, which appeared in the July issue, Pages 54 and 55.

The National Schoolmart and Schoolview is to be held in the Port Authority Commerce Building, New York City, from August 15 to 24, inclusive. The "Schoolview" will consist of a series of sessions participated in by authorities in activities pertinent to the maintenance, equipment and physical progress of schools. The "Schoolmart" will be linked with the "Schoolview" sessions, presenting the equipment, machinery, supplies and services that are essential to the school system.

According to an announcement by Dr. P. G. Agnew, secretary, the American Standards Association has reached an all-time peak in membership, with 42 member-bodies and associate members and 1,233 company members. Since January 9, associations have become member-bodies or associate members. The American Standards Association is the national clearing house for standards and safety codes. It was formed in 1918 by five technical societies which felt the need of developing inter-industry standards out of their own technical standards.

The thirty-seventh annual meeting of the American Society for Testing Materials was held in Atlantic City, June 25-29. Fifteen formal sessions were held at which ninety technical papers and reports were presented. As a result of actions at the meeting some thirty-five proposed standards were accepted for publication as tentative and upwards of forty existing tentative specifications and test methods were recommended for adoption as standard. A number of research projects on which progress was retarded somewhat due to economic conditions are being given increased impetus.

Groups of papers covering various aspects of corrosion, tinting strength of pigments, effect of temperature on metals, concrete and testing of rubber products featured various sessions. A report on quality standards for wrought iron was presented by a Society Committee. A report was given on the physical properties, service characteristics, corrosion resistant properties, etc., of light metals. This was developed in cooperation with the American Foundrymen's Association and is believed to give for the first time in convenient, compact form widely used and practical data and information on these metals. A session was devoted to a discussion of problems of specifying and controlling quality. Sampling clauses that are sometimes incorporated in specifications were discussed and a paper outlined some of the advantages from the standpoint of both consumer and producer of setting up a quality control program in a manufacturing plant.

IN THIS ISSUE:

SCHOOL SURVEY

An important type of work under the Public Works Administration has been the construction of school buildings. Up to the present time contracts totaling almost seventy-five million dollars have been let on nearly 500 projects. This new construction, however, has not been ample to meet increasing demand for space brought about by increasing enrolment, particularly in the high schools. Further complicating the problem are, aside from Federal expenditures, decreasing funds within states and counties not only for new construction but also for the maintenance and operation of existing schools. Many schools in all parts of the country have been obliged to shut down because of lack of revenue from tax sources, and general appeal is being made by the affected communities to the Federal Government for emergency aid of education. This status of the schools is described in a survey of facts which it is hoped will be helpful to the architectural profession in suggesting possible remedies.

PHOTOMURALS

A feature of the N.B.C. studios at Radio City, New York City, is a series of photomurals by Margaret Bourke-White, illustrating various phases in the transmission of radio. These photomurals are shown in a special portfolio.

FIELD BUILDING, CHICAGO

The newest and largest skyscraper building in Chicago is the Field Building, designed by Graham, Anderson, Probst and White, architects.

THE FIRST AMERICAN SKYSCRAPER

The Field Building is on the site of the old Home Insurance Building. Before its razing, a committee of architects and others was appointed by the Marshall Field Estate to determine whether this 47-year-old structure had a legitimate claim to the honor of being called the first American skyscraper of skeleton construction. The Committee reported affirmatively, but its findings are challenged by Irving K. Pond, a Chicago architect, who had first-hand experience in the construction work of that period. Both sides in the controversy are presented and the reader is free to make his own decision.

NEXT MONTH:

STORES AND MARKETS

The merchandising of foodstuffs, clothing, hardware, dry goods, has undergone many changes in recent years. The store of small town and city is evolving into new types, more scientifically planned, more convenient, better lighted and equipped. This study, with many illustrations, will cover the entire field of store and market design, with emphasis placed on produce markets since this appears to be a field of rising opportunity for architects. Attention will also be given to the approved methods for remodeling stores.

OTHER FEATURES:

A Dairy Farm Building at Wrightsville, Pennsylvania, by Delano and Aldrich, Architects.

Analysis of Activities of the National Planning Board.

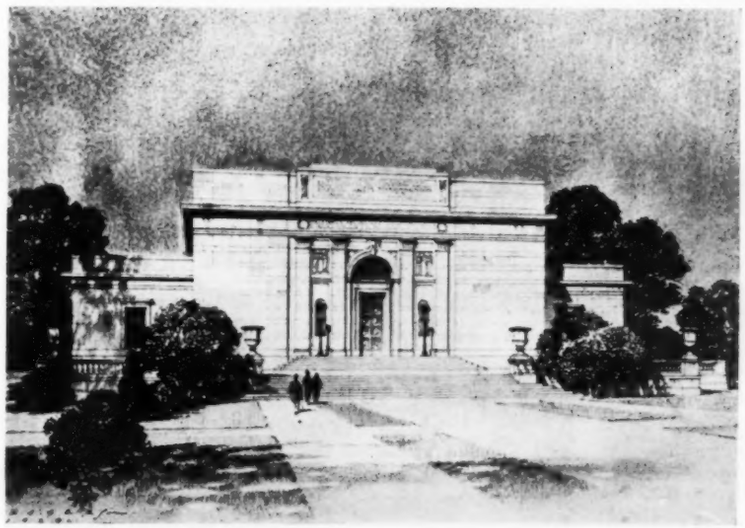
Relation of Architect and Contractor.

Robert W. Tebbs

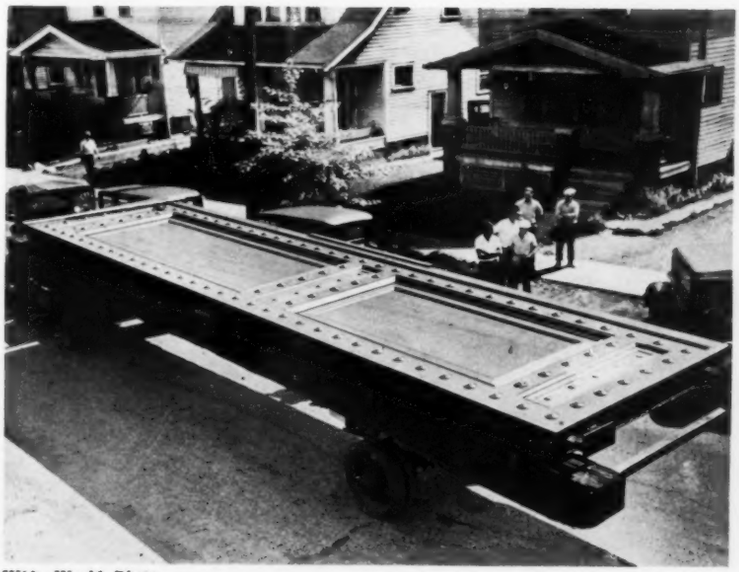
LAUXMONT DAIRY COW STABLE
WRIGHTSVILLE, PENNSYLVANIA
DELANO AND ALDRICH, ARCHITECTS

ILLUSTRATED NEWS

Drawing of Sears' windowless department store being erected on the corner of 63rd and Halsted Streets in Chicago. Nimmons, Carr and Wright are the architects.

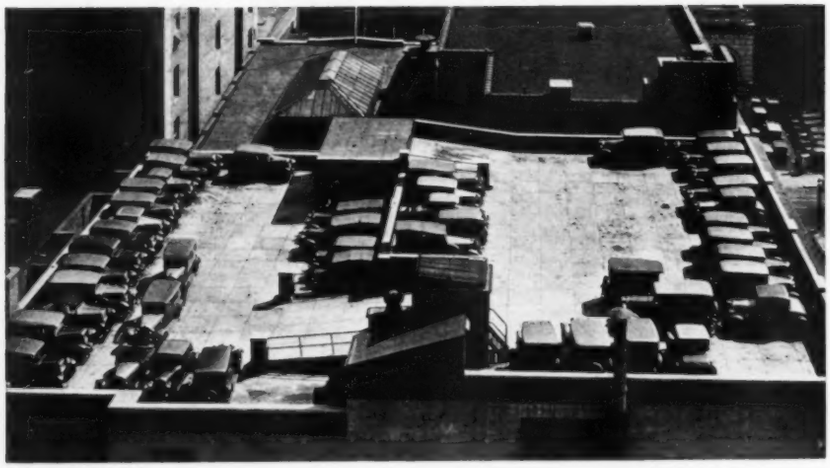


This building of Vermont marble, designed by John Russell Pope, is being erected opposite the Lincoln Memorial in Washington by the American Pharmaceutical Association. The structure is to be known as the National Institute of Pharmacy and will be the headquarters of the profession in the United States.



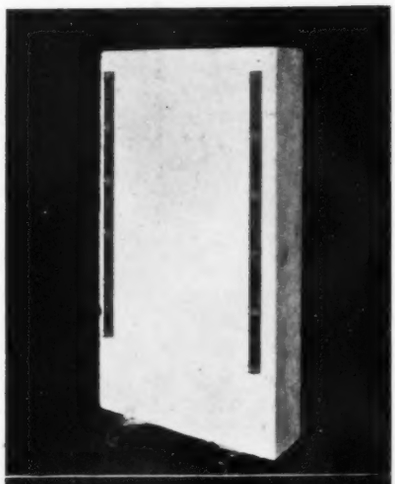
Wide World Photo

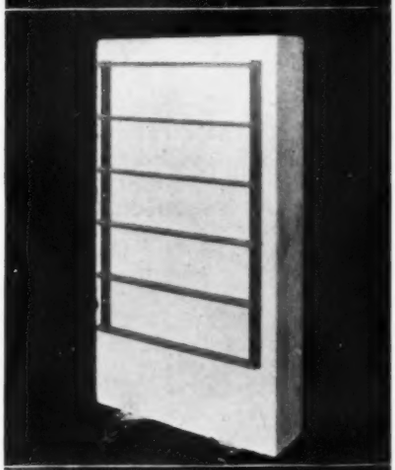
Largest door in the world on its way to Washington. Ten-ton portal, one of two each 35 feet high, 9 feet wide and a foot thick, made for the Government Archives Building, as it started from the factory in Cleveland where it was cast.

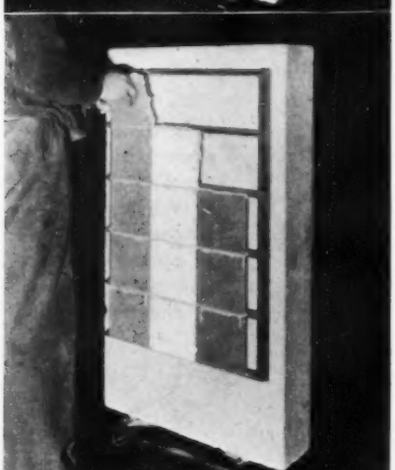


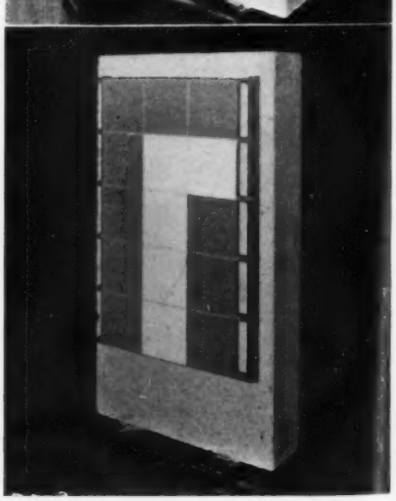
Ewing Galloway

A roof top in Baltimore, Maryland, utilized for auto parking.

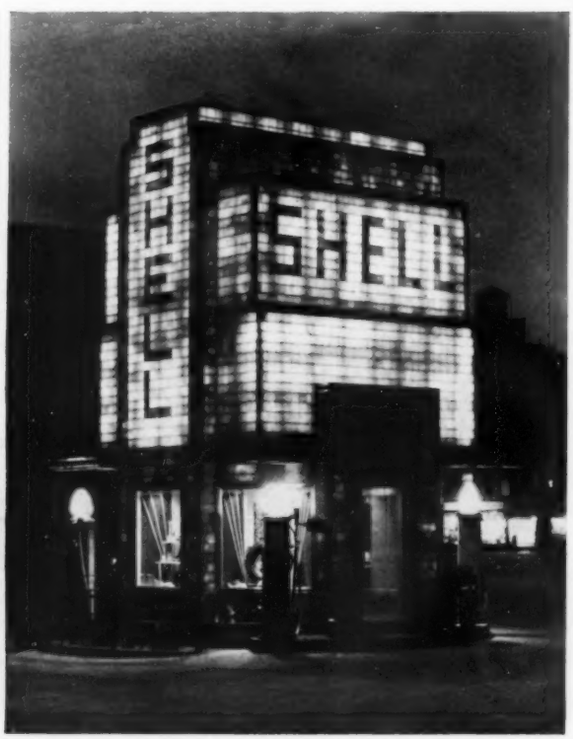






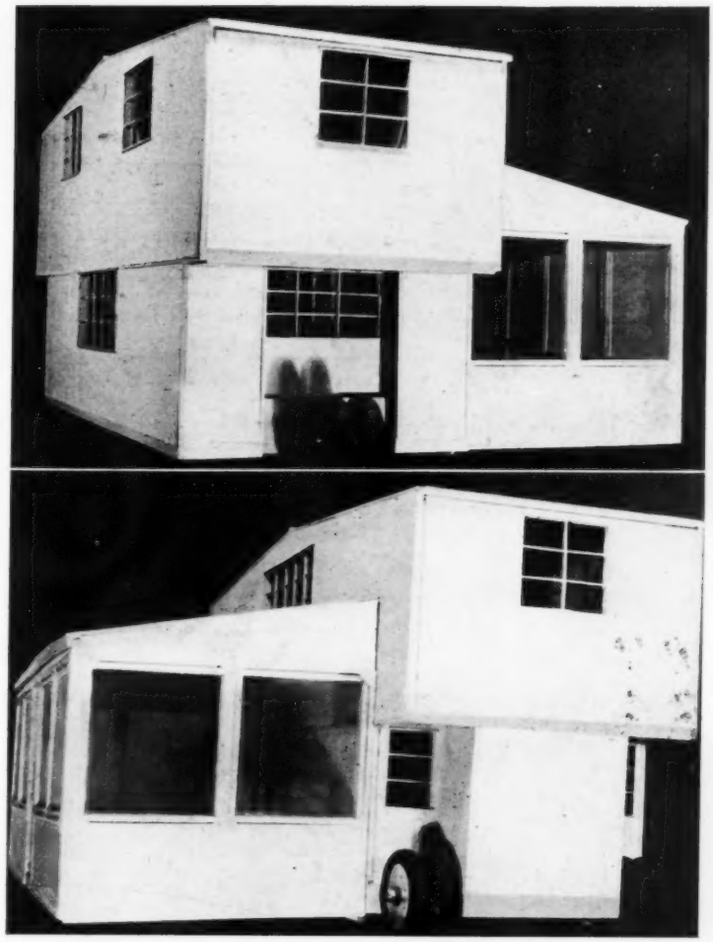


A new glass construction is demonstrated in this service station of Shell Eastern Petroleum Products, Inc., in New York City. The detail photographs show the method of construction developed by Sealed Joint Products Co. Eberson and Kautsky are the architects; Gilbert Miles Ramsey, associate architect.



bert Rothschild

Model of a portable house with "in-built mobility." Designed for mass production by Corwin Willson of Flint, Michigan.



GOVERNMENT CONSTRUCTION

The United States Treasury Department has 193 buildings already under construction as part of the Treasury construction program, according to an announcement on July 4. These buildings, mainly post offices, involve the spending of approximately $52,000,000.

The Treasury Department, in charge of the erection of Federal buildings, has in hand in all approximately 900 building projects. The amount which will have been spent when all are completed is in excess of $167,000,000. More than $110,000,000 of this amount has just recently been allotted and appropriated in order to help relieve unemployment throughout every section of the country.

The building program is now being carried out in four separate divisions, paid for from four separate funds.

200 FORGOTTEN MUSEUMS

Discovery of 200 forgotten museums in the United States, that have somehow escaped attention, was announced recently at the meeting of the American Association of Museums by the director, Laurence Vail Coleman. "These newly discovered museums are all of one kind," said Mr. Coleman. "They are historic house museums—little institutions—concerned solely with the interpretation to the public of the houses they occupy."

More than 400 of these historic houses are maintained as museums in the United States. The United States has 1,700 museums now, Mr. Coleman announced, of which 200 are large museums of first rank.

A very important change in the public's use of museums is taking place, Mr. Coleman said, in connection with little, out-of-town museums. These institutions on sites of historic or scientific fame, used to be visited chiefly by local residents, who stayed an hour or so. Now these museums are addressing themselves to people who motor from a distance. Dozens of the museums serve meals, and some provide facilities for a few visitors to stay over night. Visitors spend more time in the museum, and the museum has a better chance to teach its lessons of history or science.

"DRY ICE" AS BLOW TORCH

Solid carbon dioxide, popularly named "dry ice," may, at a temperature of 112 degrees below zero Fahrenheit, compete with heat in securing "shrink fits" for machine parts. W. H. Swanger of the National Bureau of Standards who has been conducting experiments with solid carbon dioxide reports that machine shop practice may come to accept the new method of applying excessive cold instead of heat in shrinking metals.

When it is necessary to secure a metal band to a shaft, the usual practice is to heat the band. Expansion allows it to be slipped into place, and as it cools it contracts to a tight fit. However, by "refrigerating" the inside part, or shaft, it can be shrunk materially. The band is slipped on and when the shaft warms to room temperature it expands again to normal size, and a tighter fit is secured.

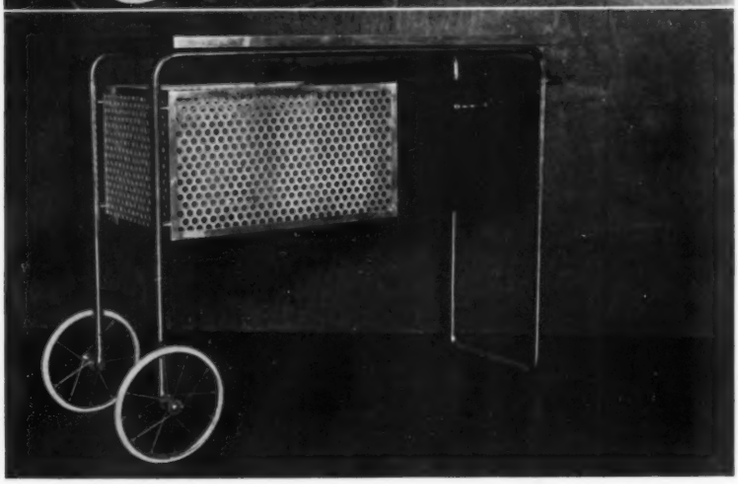
ELECTRICITY BLIGHTS WATER

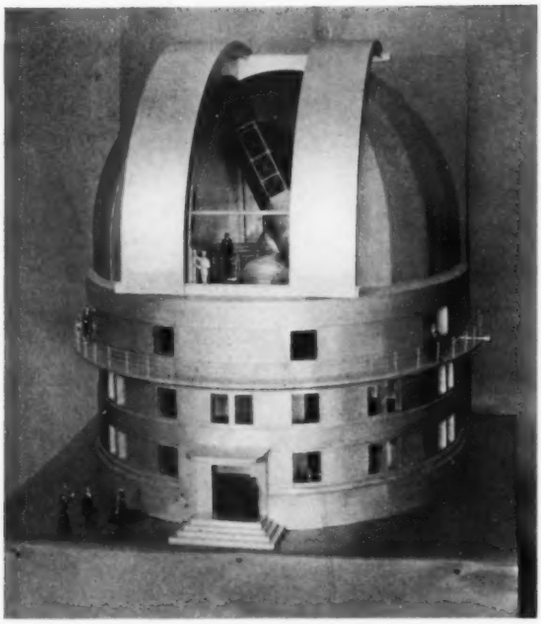
Fugitive electric current has been identified as one of the surreptitious forces that at intervals blight water supplies, according to a report of researches in northern New Jersey by the Hackensack Water Company.

Coursing along a water pipe which provides a metallic path through the house wiring system from some household electrical device such as a vacuum cleaner, it seems to be a possible cause of certain tastes and odors which mysteriously appear in the water delivered to a consumer, yet absent in water in the street main, the report declares.

MAYANS POOR BUILDERS

It was lack of imagination, according to Science Service, that kept Mayan Indians in the American tropics from looking at their beautifully ornate stone buildings and seeing how the construction could be much improved. The Mayan engineers never discovered the principle of the true arch. They never learned the trick of





(Above) Model of McDonald Observatory for University of Texas showing great reflecting telescope with its 80-inch mirror and 62-foot revolving dome. When erected on Mt. Locke, it will be the second largest in the world. Length of tube—26 feet. Total weight of moving parts of telescope—45 tons.

(Left) A small portable bar designed by Alfred Roth, architect, of Zurich, Switzerland.

bonding or overlapping their building stones to make a firmer structure.

This is the verdict of Lawrence Roys, noted engineer, who has just completed an appraisal of the engineering knowledge of America's most famous prehistoric builders. Mr. Roys made his study under the auspices of the Carnegie Institution of Washington.

The imagination of the Mayas was poured out on artistic creations. The sculptors never wearied of contriving elaborate patterns and resplendent figures of gods and men. But the engineers and architects who laid the plans and raised the walls achieved no comparable progress in technique.

"It would seem," says Mr. Roys, "that their architects thought in terms of monolithic masses wherever possible, and took comparatively little interest in the manner in which individual stones were laid together."

The Mayas developed only moderate skill in fashioning the dry rubble masonry of roadways, platforms, and pyramids. They do not seem to have tried using wood to supplant stone in their more permanent structures. Their wall building methods set up strains when the foundations settled, and resulted in long vertical cleavages. In handling lime cement or concrete, on the other hand, Mayan builders made better progress, and Mr. Roys is highly complimentary to the real skill they acquired in using this medium. As for their greatest engineering achievement, he considers this to be the vaulted roof.

TOMORROW'S ARCHITECTS

There is much evidence to point to a promising future for architects of a wholly new type, according to Walter B. Pitkin*:

"They will be trained both in design and in engineering. And they will concern themselves especially with small and inexpensive home planning and mass production, as well as with community building.

"There is much evidence, however, to point to a promising future for architects of a wholly new type. They will be trained both in design and in engineering. And they will concern themselves especially with small and inexpensive home planning and mass production, as well as with community building.

"Look for your first chance in small communities where there is a proved demand for cheap and medium priced homes. At first they will not be efficiently produced. Mass production will arise only with a marked improvement in employment and purchasing power. Should the Federal Government step in with a vast housing program, look for a revolution in the industry almost overnight. Otherwise the demand for the next few years is likely to be for progressive architects who can shoulder the responsibilities not only of design, but of construction and financing as well. Home owners have so long been cheated by grafting builders, contractors, and real estate and financial agents that they turn steadily to reliable architects to take full charge of their entire program. To succeed here, architects must know their communities, the physical and financial requirements of the dwellings, as well as the economic status of prospective owners.

"When pre-fabricated housing develops on a large scale, the old-style architects will yield to competent designer-engineers. The latter must have exhaustive knowledge of building costs, materials, and the most efficient and inexpensive production methods. Since the average householder is suspicious of radical change in exterior design and materials, the first revolution will occur in construction. More and more home owners will accept and soon demand air conditioning throughout the home, standardized tight windows, rooms sound-proofed against both inside and outside disturbances, a more flexible distribution of electrical outlets, and a far more efficient floor plan.

"As to building in general, there has been so little of it during the past four years that soon a substantial amount of new building will be necessary. When not used, building space wears out rapidly, and as new industries develop they require new conditions of enclosure. Hence new demands may soon become so enormous that the architectural profession will be put to it to rebuild its lost organizations."

The author's comments on architects and architecture were amended and approved by Harvey Wiley Corbett.

---

*_New Careers for Youth_. By Walter B. Pitkin. Simon and Schuster, 386 Fourth Avenue, New York City. 236 pages. $1.50

General view of concourse in the new railway station at Hamilton, Ontario, in Canada. The wainscot, doors and frames, counter grilles, column coverings and walls are all steel. The walls are finished in baked enamel of a deep terra cotta color. The column coverings are also of steel, finished in bright aluminum enamel.

The huge chimney of the United States Government Assay Office at South Street and Old Slip in New York City—a rival to the Manhattan skyscrapers.

Keystone-Underwood

GUILBERT AND BETELLE, ARCHITECTS

Photograph by George French

VISUAL EDUCATION AT NEWARK, N. J., PUBLIC SCHOOL OF FINE AND INDUSTRIAL ART

THE
ARCHITECTURAL RECORD
VOL. 76, NO. 2 AUGUST, 1934

NEW SCHOOLS ARE NEEDED

By C. THEODORE LARSON

A general survey of educational conditions in this country reveals two major trends:

(1) Because of tax delinquencies and dwindling revenues, school services in general have been seriously restricted and in many communities, particularly those in rural areas, the schools have been closed entirely.

(2) At the same time population growth and industrial code provisions limiting child labor have increased enrolments, especially in the vocational and high schools, to an extent which indicates a widespread demand for new school construction.

This present inadequacy of educational opportunities has resulted in appeals by the distressed localities and States for emergency Federal aid. Several bills were introduced in Congress to provide such funds, and from February 26 to March 1 hearings were held before the Committee on Education, House of Representatives. This committee unanimously reported the Douglass Bill, permitting grade and high schools to draw on a $75 million fund under FERA supervision and on the advice of the U. S. Office of Education; it was emphasized that the measure would be limited to one year and should be considered in no sense the beginning of a permanent policy of Federal aid to the schools. The recommended bill failed to come to a vote before the adjournment of Congress.

REDUCED EXPENDITURES FOR SCHOOLS

Perhaps the most complete summary of existing conditions is to be found in the report of the National Committee for Federal Emergency Aid for Education which was read into the record of the Congressional hearings.* The following facts, based on findings of the U. S. Office of Education and the Research Division of the National Education Association, were quoted:

(1) Many schools, affecting thousands of children, failed to open in September 1933.

(2) Before January 1, 1934, about 2,600 schools were closed, denying 140,000 children the opportunity to attend school.

(3) Except for such Federal aid as has been and may be granted this year, 20,000 schools involving more than a million children will cease to operate by April 1, 1934.

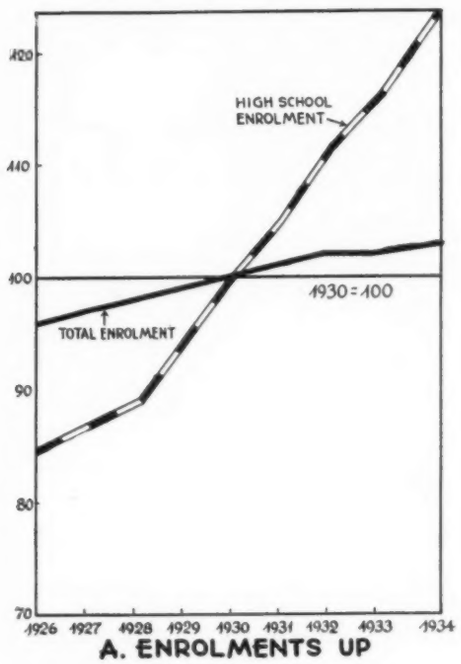
(4) Many public schools are being kept open only by charging tuition.

(5) Important units and services such as kindergartens, health services, and classes for handicapped children have been discontinued.

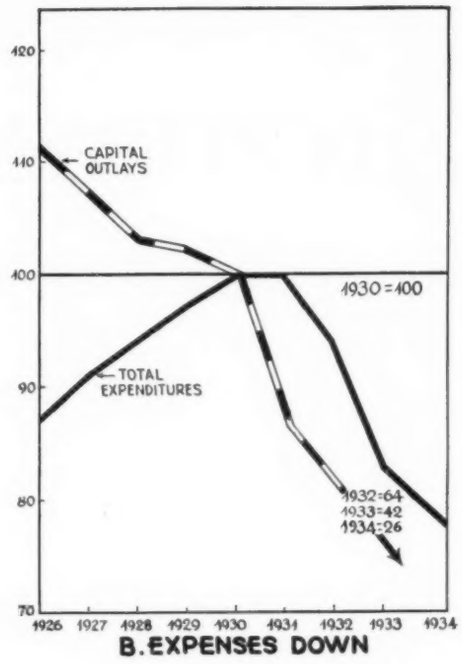
(6) Building programs have been almost completely discontinued. Although more than 400,000 pupils in city schools and a much larger number in rural districts are improperly housed, expenditures for school buildings are 74 per cent lower than those of 5 years ago and 76 per cent below expenditures in 1926.

*Pages 29-48, *Hearings before the Committee on Education, House of Representatives, Seventy-Third Congress, Second Session, on House Bills Providing for Federal Emergency Relief for Education, February 26, 27, 28 and March 1, 1934*: U. S. Government Printing Office. The statements recorded in this document of 249 pages give detailed descriptions of the educational crisis in different communities.

RECENT TRENDS IN PUBLIC SCHOOL STATISTICS



A. ENROLMENTS UP



B. EXPENSES DOWN

(7) Approximately 40,000 fewer teachers were employed in 1934 than in 1933 and nearly 60,000 fewer than in 1932. In view of advancing enrolments, this means a dangerous increase in class size.

(8) More than 200,000 teachers (one-fourth of them all) are receiving less than $750 per year, the minimum amount paid factory workers under the blanket code of the President's Reemployment Agreement. Approximately 85,000 of these teachers are receiving less than $450 a year.

(9) At the close of the school year 1933 in city school systems alone, unpaid salaries amounting to $29,689,749 were reported. For the nation as a whole, total unpaid salaries exceeded $40,000,000.

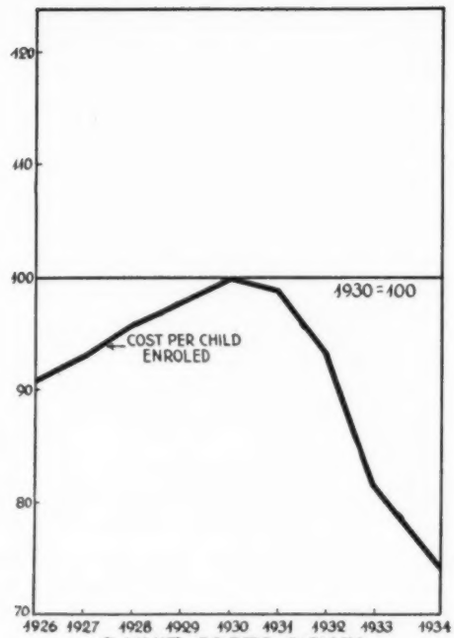
(10) Returns from 29 States about February 15, 1934, showed the sum of $33,-172,000 in outstanding warrants and certificates of indebtedness for teachers' salaries in 14 States. In addition, there were 9 States with unpaid salaries amounting to a total of $11,108,000. In 6 other States warrants were being cashed at discount rates ranging from 5 to 40 per cent, no estimate being available on the amount outstanding. In only 8 of the 29 States were all salaries being paid in cash when due.

(11) To operate schools, even with the rigid economies outlined above, Federal money amounting to more than $5,675,000 will have been used by March 1, 1934, for the salaries of teachers on relief rolls. These expenditures touch only the most serious aspects of the problem in limited areas and are far short of the sums really needed. Nevertheless, Federal funds will be used in increasing amounts during the remainder of the year as local and State school funds are exhausted.

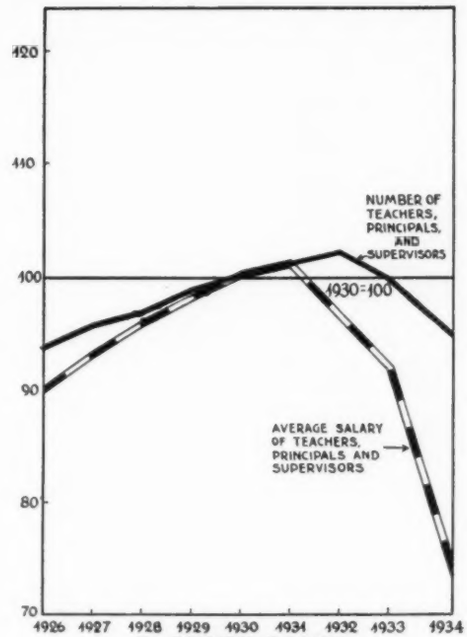
According to the report, incomplete returns from 36 States show that on January 15 of this year more than 5,000 teachers were being kept in regular classrooms by Federal aid. An indication of the growing need for this relief is seen in the statement of disbursements month by month: October, $75,000; November, $316,-902; December, $1,280,791; January, $1,611,-556; February, in excess of $2,500,000.

About 75 per cent of school funds normally are obtained from the general property tax. During the past few years, however, two trends —(1) a decline in the assessed valuation of property and (2) an increase in tax delinquency —have operated to curtail this source of revenue. The possibility of obtaining in 1934-35 additional revenue from State and local sources is lessened by tax-limitation laws existing in many States and by the fact that tax levies in many cases are already at the maximum.

Although State governments can tap sources not available to local school districts, the Federal Emergency Aid Committee report goes on to say, there is no evidence that they will be able to extend enough aid where local resources are depleted to keep the schools functioning during 1934-35. An abnormal growth in the bonded debt for school purposes was registered



C. UNIT COSTS DOWN



D. STAFF DOWN

RESEARCH DIVISION
NATIONAL EDUCATION
ASSOCIATION

in the period 1930-32, and further State and local borrowing for school support is impractical, for—as the report states—if credit facilities were available, school districts would not be indebted to their employees to the sum of more than $40 million.

During February statements were obtained from 44 State departments of public instruction in an effort to determine the school revenue available in 1934-35. In 8 States conditions are so uncertain that the State superintendents could make no prediction, but in 21 States which did report estimates, the expected income for 1934-35 is 30 per cent below expenditures in 1932 and 35 per cent below those in 1930.

INCREASING NEED FOR NEW SCHOOLS

During the depression years expenditures for school construction have dwindled rapidly, dropping from a capital outlay (purchase of buildings, sites and major equipment) of $370,878,000 in 1930 to an estimated $97,600,000 in 1934 (National Education Association figures). The bulk of recent construction is attributable to Federal funds: up to June 15 the Federal Emergency Administration of Public Works reports a total allotment of $74,189,860 for 493 school projects.

In many fields declining construction has followed declining demand as a result of business and industry moving more slowly, but in the school field the demand has steadily *increased,* as shown by enrolments. Each year roughly 200,000 more children have entered the public schools than in the preceding year—an annual gain of slightly less than 1 per cent.*

The number of high school students has increased at a much more rapid rate than the total enrolments—about 2 per cent annually from 1926 to 1928, and about 4 per cent thereafter. It is probable, according to the National Education Association, that all or nearly all of the increase in total enrolments is now occurring in the high school bracket. This conclusion is confirmed by estimates of the U. S. Office of Education which suggest that elementary school enrolments in the nation at large have already begun to decrease. The increase in high school enrolments is also significant financially, because it is in this classification that higher costs are involved.

Since the discontinuance of school building construction cannot be attributed to lessened demand, only two other possibilities remain, as James H. Richmond, chairman of the National Committee for Federal Emergency Aid for Education, points out:† Either (1) school construction was so far ahead of actual housing needs at the beginning of the depression that few additional buildings were required, even with an additional enrolment of a million pupils, or (2) a building program has been halted that should have been carried forward.

No significant rise in school building expenditures occurred after 1922. Beginning with 1926, four years before the first depression year, the

*Research Bulletin of the National Education Association, November, 1933.

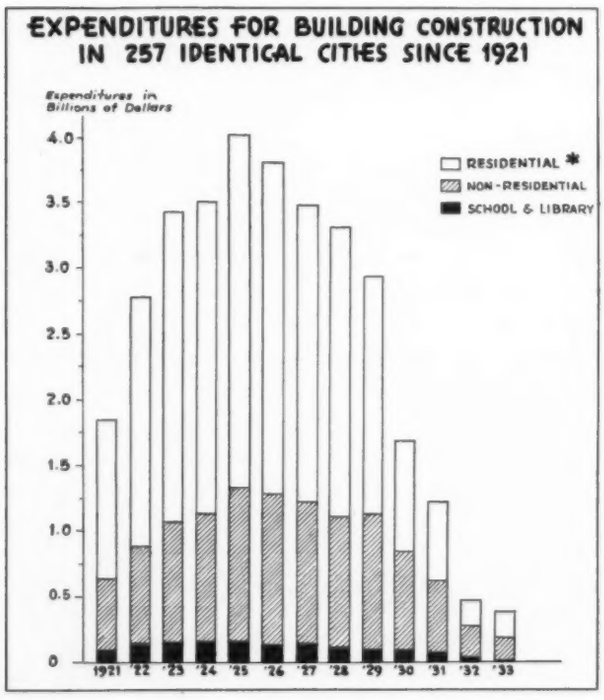
†Statement in support of the Gregory Bill, H.R. 8955, specifying that not less than 10 per cent of any funds appropriated for public works by the 73rd Congress should be used to provide proper housing in public schools and public colleges.

trend turned downward and, since 1930, the drop has been precipitous. Comparing school construction with building construction of other types, Mr. Richmond finds that:

> Between 1921 and 1923 school and library construction forged slightly ahead of all nonresidential construction, and since 1930 it has run ahead of residential construction. But from 1924 through 1929, during the height of prosperity, school building construction lagged behind other types. Never since 1923 has the index for school and library projects equaled that for nonresidential construction in general.

Since the data just presented have not been related directly to school enrolments, broad generalizations with respect to the adequacy of school building programs cannot be drawn from them. In view of the fact, however, that school building construction lagged behind construction of other types during a period of rapid school growth (one in which school enrolments increased approximately 20 per cent as compared with an increase of only 16 per cent in the general population), these data indicate conservatism rather than unjustified expansion.

Although no complete summary of the school building needs of the nation is available, enough facts are at hand to show that a widespread and urgent need exists. On the basis of reports from 1,266 cities, it is estimated that during the school year 1932-33 more than 26,000 children in city school systems attended school on a part-time basis and that about 145,000 were housed in temporary or portable buildings. Thus, leaving out of consideration for the moment the need for better school buildings in rural communities, and disregarding also the increases in enrolment, more than 400,000 school children are improperly housed.



*Included with the amounts for residential purposes are sums reported for additions, alterations and repairs. Source: U. S. Dept. of Labor, Bureau of Labor Statistics, *Building Operations in Principal Cities in* 1932; page 844.

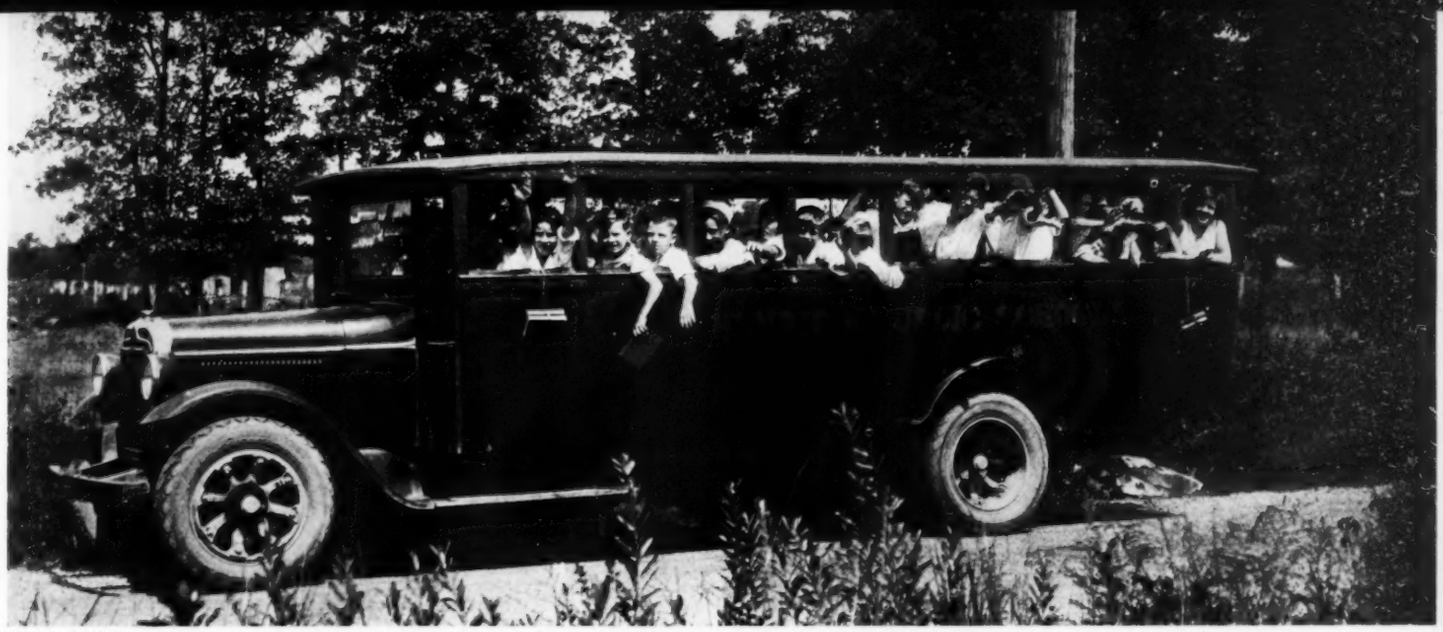
EMERGENCY EDUCATIONAL PROGRAM

Within recent months Federal agencies have begun aiding the schools. In reply to inquiry, the Educational Division, Federal Emergency Relief Administration, writes that during the fall and winter the Relief Administration maintained an emergency educational program consisting of various phases of adult education and nursery schools. Some funds were authorized for the aid of rural elementary schools in communities under 2,500 population which were financially unable to continue to provide a normal length of school term. This entire emergency program received a total of some 9 million dollars.

On February 2, Harry L. Hopkins, Federal Emergency Relief Administrator, issued a new authorization permitting relief funds to be used in school districts where State and local finances had broken down completely, and where, without extra aid, the public schools would be obliged to close short of a normal term. This authorization was made available not only to elementary schools but also to high schools in communities up to 5,000 population. From February 2 to the end of the current school year, a total of $16,924,659 was spent in 33 States under this specific authorization.

As part of a student aid program, relief funds totaling about $4,500,000 were extended to 75,000 men and women students in universities and colleges to complete their courses. This aid averaged $15 a month for each student in return for nonclassroom work. The beneficiaries were attending 1,300 colleges and universities throughout the country and represented approximately 10 per cent of the registration.

No relief funds were made available under any FERA authorization for the maintenance of school buildings and equipment. Under the CWA, the building program primarily restricted renovation and remodeling but not drastic reconstruction; new construction was limited almost entirely to small rural schools. In establishing nursery schools CWA labor was made available for remodeling a few rooms in existing school buildings.



Ewing Galloway

"Good roads and buses now provide easy transportation over large areas and permit consolidation of school districts."

LONG-RANGE IMPLICATIONS

The National Education Association and other professional and civic groups have joined in urging the Federal government to give consideration to the needs of the schools as part of the emergency recovery program. The Congressional hearings, however, make clear that there are two well-defined schools of thought concerning education as a permanent policy—one believes that education is essentially the duty of the State, the other believes that the Federal government should assist the States as a national policy.

In many States educators have made surveys to determine economies which would put the public schools on better financial footing and which could be made without injury to school children or their teachers. The most important of these possibilities is reorganization of the district system to secure larger and more effective administrative division. The old-fashioned school district, which is the unit in most States, is criticized as being awkward and wasteful in a time when children no longer must live within walking distance of their school. Good roads and buses now provide easy transportation over large areas, and permit consolidation of districts.

Experience shows, however, that change in the administrative structure of the schools is usually a slow and difficult process because of local prejudices. As William J. Wallace, secretary of the House Committee on Education, comments in the May issue of *School Life*:

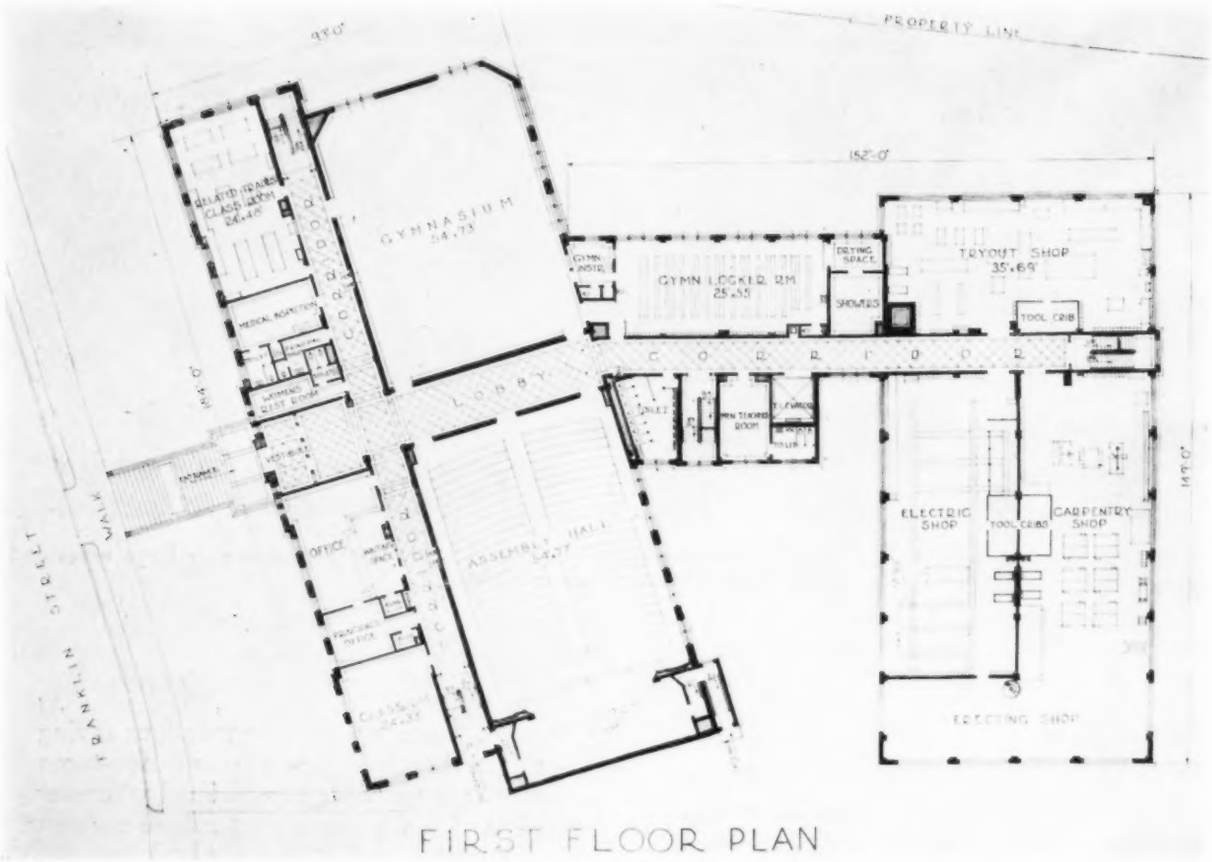
> Perhaps one of the most startling conditions brought to light during the hearings was the almost complete lack of consolidation of rural schools. There were situations in many States where a tremendous saving could be made if these small one-room country schools were consolidated wherever possible. Local pride often tends to prevent consolidation, and it also appears that the only worthwhile consolidation that can be made must be based upon a State-wide survey and not independent county surveys.

Further confirmation of the desirability of such administrative reorganization is expressed in a statement by William G. Carr, director of research division, National Education Association, to The Record:

> Desirable consolidations of rural school districts should be encouraged in the interest of economy and educational efficiency, but such consolidations are blocked in many communities by the inability of rural districts to provide the funds necessary for the required new consolidated buildings. The old one-room schools have become obsolete because of changes in social conditions largely beyond the control of the rural population. The rural population is not able at the present time, and cannot reasonably be expected, to finance the construction of new buildings and to absorb the loss resulting from the abandonment of the old buildings.

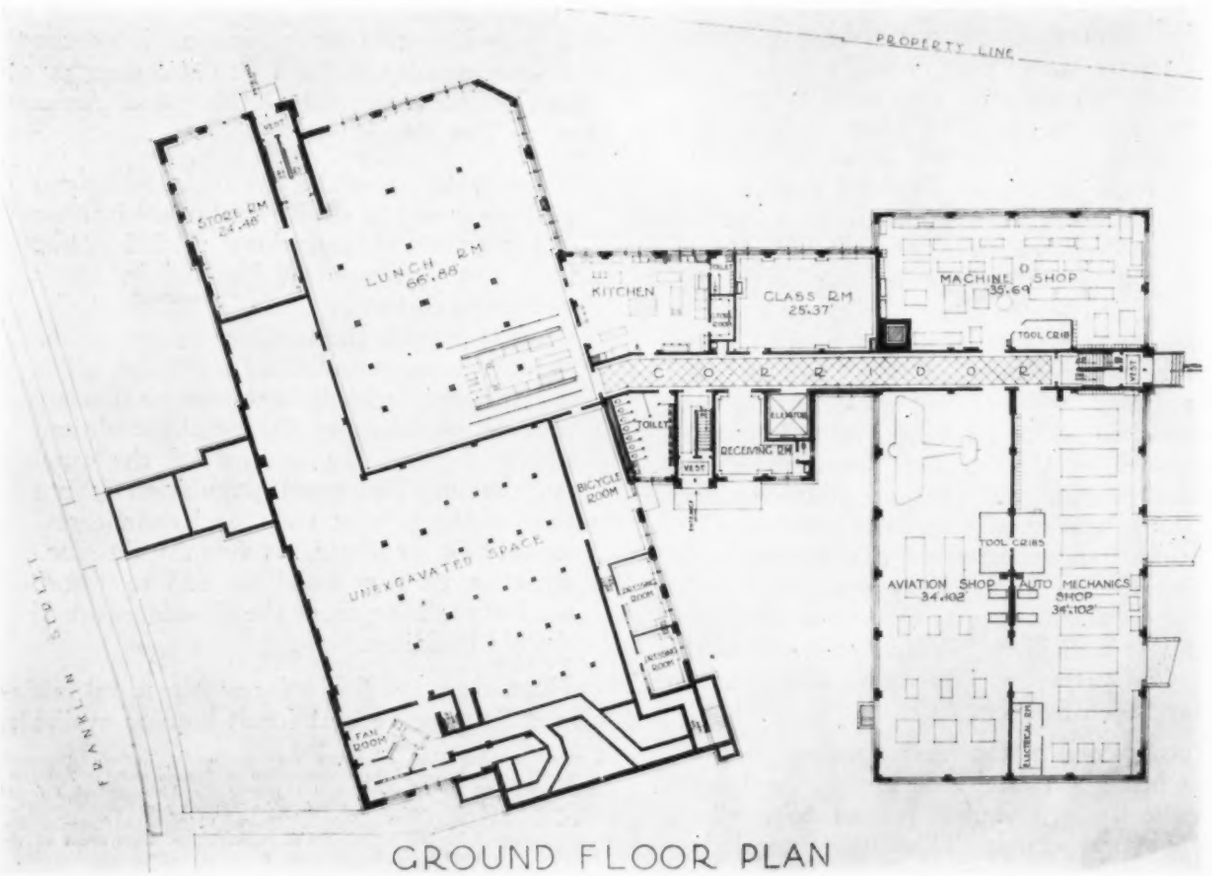
Here, then, is a field* for architectural initiative if State or Federal funds become available.

*Two mimeographed pamphlets may be useful in this direction: *Financial Implications of the Consolidation of Schools and the Transportation of Pupils*, by Timon Covert (Circular No. 117), and *A Selected and Annotated Bibliography on Education During the Depression, Particularly Emphasizing Economies*, by Martha R. McCabe (Circular No. 118), published by the Office of Education, U. S. Department of the Interior, Washington, D. C.



FIRST FLOOR PLAN

ESSEX COUNTY BOYS VOCATIONAL SCHOOL AT BLOOMFIELD, NEW JERSEY



GROUND FLOOR PLAN

VOCATIONAL SCHOOLS

INCREASING ENROLMENTS BECAUSE OF INDUSTRIAL CODES INDICATE A BUILDING NEED

By JAMES O. BETELLE, Architect

THE object of the vocational school is to fit an individual to pursue effectively a recognized profitable employment, thus enabling him to earn a better living and at the same time to raise the general standard of citizenship. It also provides opportunities that will encourage the progress of individuals into more desirable occupations. It is intended for persons over fourteen years of age who are preparing for a trade or industrial pursuit, and for those who have already entered a vocation.

It is not designed to take the place of the general education now given in the regular schools, but in a large measure is intended to keep at school those pupils who would otherwise leave to go to work. The number of pupils seeking employment at an early large is large, and the cause of their leaving school is not always an economic one. With courses of studies such as the vocational schools provide, many of these pupils can be kept at school two or three more years and receive sufficient training in useful occupations to take them out of the unskilled labor class.

Vocational schools are run on several different plans: (1) the all-day vocational school, where the pupil devotes the entire school day to instruction. (2) The part-time or continuation school, where the pupil, having already gone to work, devotes a part of the working time for further education. (3) The evening school, where mature workers attend evening classes, receiving instruction supplementary to their day employment.

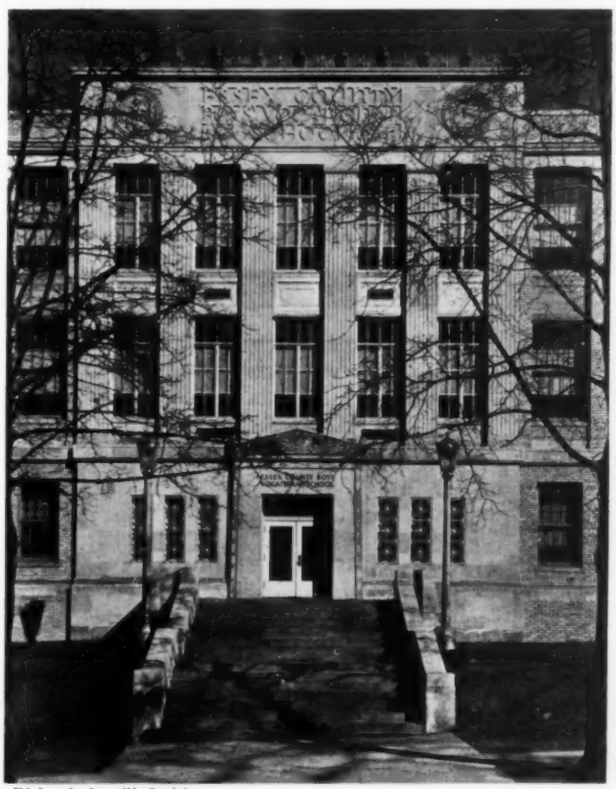
The subjects taught and the instruction given in each course are recommended or approved by an advisory committee consisting of representative men and women actively engaged in those particular fields. Thus is maintained a close contact with those who know what the students should be taught. (The wide range of subjects is indicated by the accompanying illustrations.)

ALTERATION POSSIBILITIES

It is sometimes desired or suggested that an available large factory, possibly vacant or for sale, be altered and used for a vocational school. At first this appears feasible and a good way to obtain large accommodations for very little money, and it has been successfully done in a number of cities. However, it has disadvantages, such as improper location regarding the center of school population, transit facilities and environment. The window lighting area will very likely be far below the recognized standard or law requirements; ventilation and heating will be inadequate, and lighting and toilet facilities bad. On the other hand, it would have the advantage of large areas and closely approach actual shop-working conditions.

Old abandoned school buildings are sometimes suggested in order to get the vocational school started at minimum expense. These have the disadvantage of small rooms difficult to alter, and fail to impress the pupil with the atmosphere of a shop, which is important to secure efficient results. The principal advantage is the saving in first cost. It is unnecessary to state the advantages of a new building, specially designed and properly located for the vocational school. These advantages are, of course, recognized and a new school provided in all cases where funds are available.

ESSEX COUNTY BOYS VOCATIONAL SCHOOL AT BLOOMFIELD, NEW JERSEY GUILBERT AND BETELLE, ARCHITECTS



Richard Averill Smith

LIBRARY

LOCATION OF SCHOOL

There are many advantages in a school composed of a group of buildings. The separate buildings can be devoted to the various trades and additional buildings can be built as needed. The shops can often be erected one story high and made to approximate very closely actual shop conditions. Naturally, a site of large area is required for such a scheme.

The location of a vocational school is just as important as the location of ordinary schools, but for somewhat different reasons. The center of the school population of the city or district is not so important in this case as a proper location easily accessible to the majority of the pupils. The school should also be convenient to the various manufacturing plants, as part-time courses may be provided wherein the school shops are used for special instruction to apprentices in their respective trades on certain days of the week during specified hours.

While a quiet location is essential for the ordinary school, it is not so important for the vocational school, although desirable. Many of the pupils will come from a distance, and accessibility to trolley lines or other means of transportation is therefore important. As the school is likely to be located in a very busy section of the city, school playground space will be expensive and is not an absolute necessity. The children attending this type of school would get considerable exercise in their school and shop work, and a school gymnasium is generally included.

DESIGN CRITERIA

A vocational school should be given the expression of both a factory and a school. On the whole, the design should provide as ideal conditions as funds will permit, so that the pupils will be used to the best shop conditions, and thereby create a demand on the part of labor for a betterment in shop conditions in the various trades when the pupils begin their working career. The academic departments should be planned in the usual way, as now standard in ordinary schools, and if possible should include an auditorium and gymnasium. The portions devoted to shops should be in large areas, on account of the constant changing in importance of the various industries, which makes a flexible plan desirable. Two similar activities can be conducted side by side in one large space, without a dividing partition, so that if more room is needed in either study this may be readily arranged. In arranging the shops and academic departments, these should be in separate groups with the classrooms centrally located, as all shops will need to use them. In the shops, units of fifteen pupils each can best be handled in one group, while in the academic department the usual high school class of thirty pupils is satisfactory.

SCHOOL EQUIPMENT

There is nothing particularly unusual about the plumbing and electric equipment, except that enough should be provided, arranged and of sufficient capacity so that changes and additions can be made at a minimum of trouble and expense.

It has been pointed out that most vocational schools are either overequipped, or have too much equipment of one kind. It is much better to have a few of a variety of apparatus than many of one kind. It must also be realized that new machinery and methods are constantly being developed and the shop equipment to be most effective must be kept up to date. In private business, competition is so keen that changes and improvements must be made to keep up with the procession. In the school problem, no such situation arises; the tendency is to keep on using old machinery and methods and thus to save expense; needless to say, this is bad economy. A variety of equipment also permits individual instruction, which is so much to be desired over a group or class instruction.

COSTS

A definite statement as to the cost of vocational schools is difficult in these days of varying and rising prices. It is safe to say, however, that a school building of the vocational type will cost at least 10 per cent more than an ordinary school of the same cubature. The reason for this can be readily understood when one considers the heavier construction of floors and walls needed to support heavy moving machinery, and the additional and scattered plumbing necessary in washrooms, toilets, and drains for special equipment. Electric wiring must be much more elaborate to provide service for the different individual motors on the various machines and the increased individual lighting required at each bench and machine, in addition to general illumination. A saving, however, is made in the simple and cheap shop construction as compared with the more costly school classroom construction.

The cost of teaching and of equipment and maintenance is somewhat beyond the scope of this article, but generally this expense is high. It can be cut down within reasonable limits by making the shops serve some purpose beyond that of education. Useful articles can be made and sold, or made for use somewhere else in the school system. By not buying all the needed equipment when the school opens, pupils can have the experience of making certain portions. In many instances odd jobs and minor new work in the school system, such as repairing broken glass, painting outside and interior of the building, are done by the students all to good advantage.

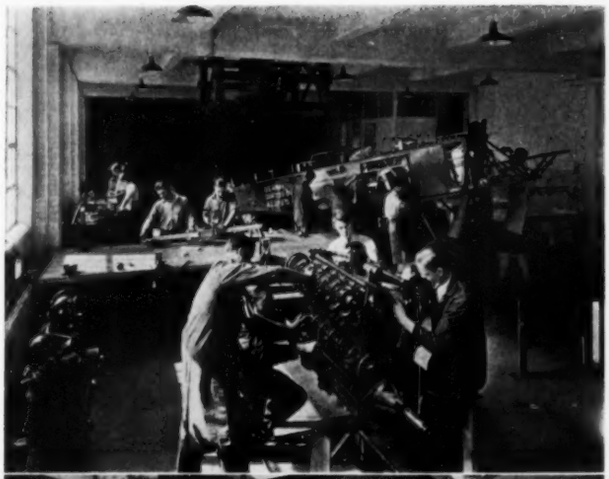
It has been pointed out that vocational education is expensive, but that ignorance is more expensive. It is coming to be more and more recognized that money devoted to education is an investment rather than an expense. In connection with vocational schools a more or less complete department of vocational guidance is maintained. It is here that the young people are advised and counseled as to their future occupation and life work. The object is to avoid the economic loss of misfits in industry, to explain the meaning and advantages of the various trades, and to assist the pupil in making a wise choice of a pursuit for which he is best adapted. While the vocational school is primarily to guide the pupil in his selection of a trade, it is to a certain extent an employment bureau as well. Here employers make application for help, and positions are obtained for the pupils. Record is also kept of the needs of the various industries, to the end that the vocational institution shall fulfill the demands of labor but avoid overproduction in any department.

ESSEX COUNTY BOYS VOCATIONAL SCHOOL AT BLOOMFIELD, NEW JERSEY

GUILBERT AND BETELLE
ARCHITECTS

Right:

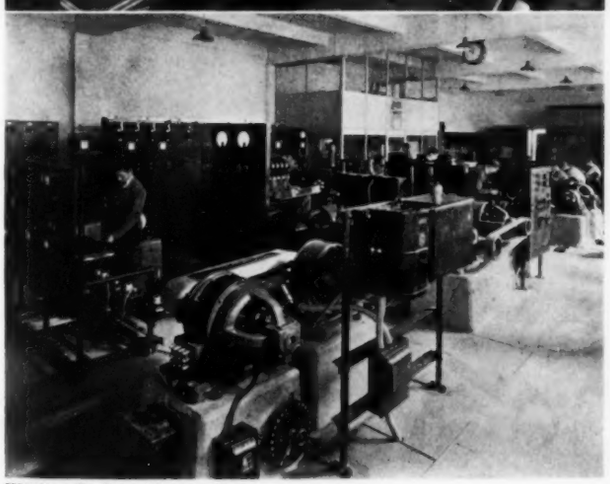
(1) Aviation shop. (2) Automobile shop. (3) Machine shop. (4) Electrical shop. (5) Drafting room. (6) Cafeteria kitchen. (7) Carpentry shop. (8) Plumbing shop.



1

2

3



4

William F. Cone photographs

5

6

7

8

ESSEX COUNTY GIRLS VOCATIONAL SCHOOL AT NEWARK, NEW JERSEY

GUILBERT AND BETELLE
ARCHITECTS

William F. Cone

Left:
Main entrance lobby. The show windows are used in training students in window decoration.

Right:
(1) Display shop. (2) Millinery class. (3) Power machine operation. (4) Advanced dressmaking class. (5) Dental assistants class. (6) Art class. (7) Beauty culture class. (8) Manicure class.

1

5

2

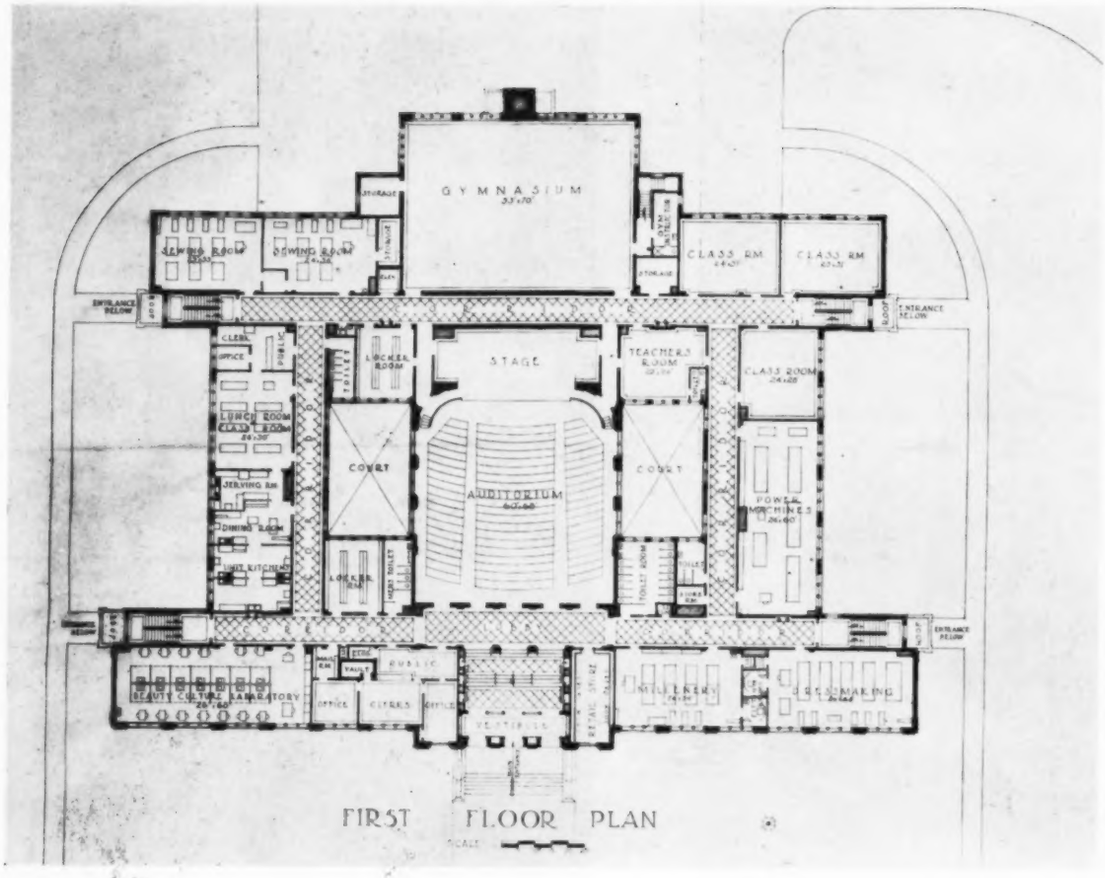
6

3

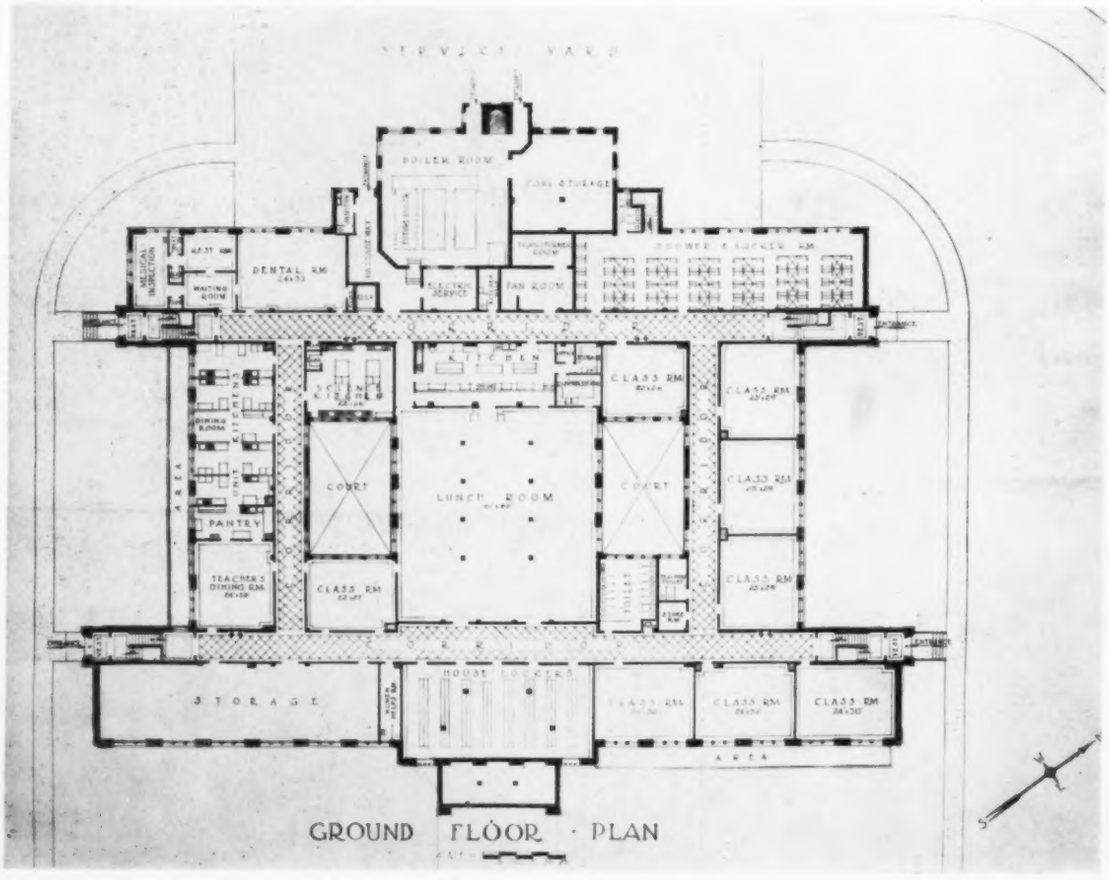
7

4

8



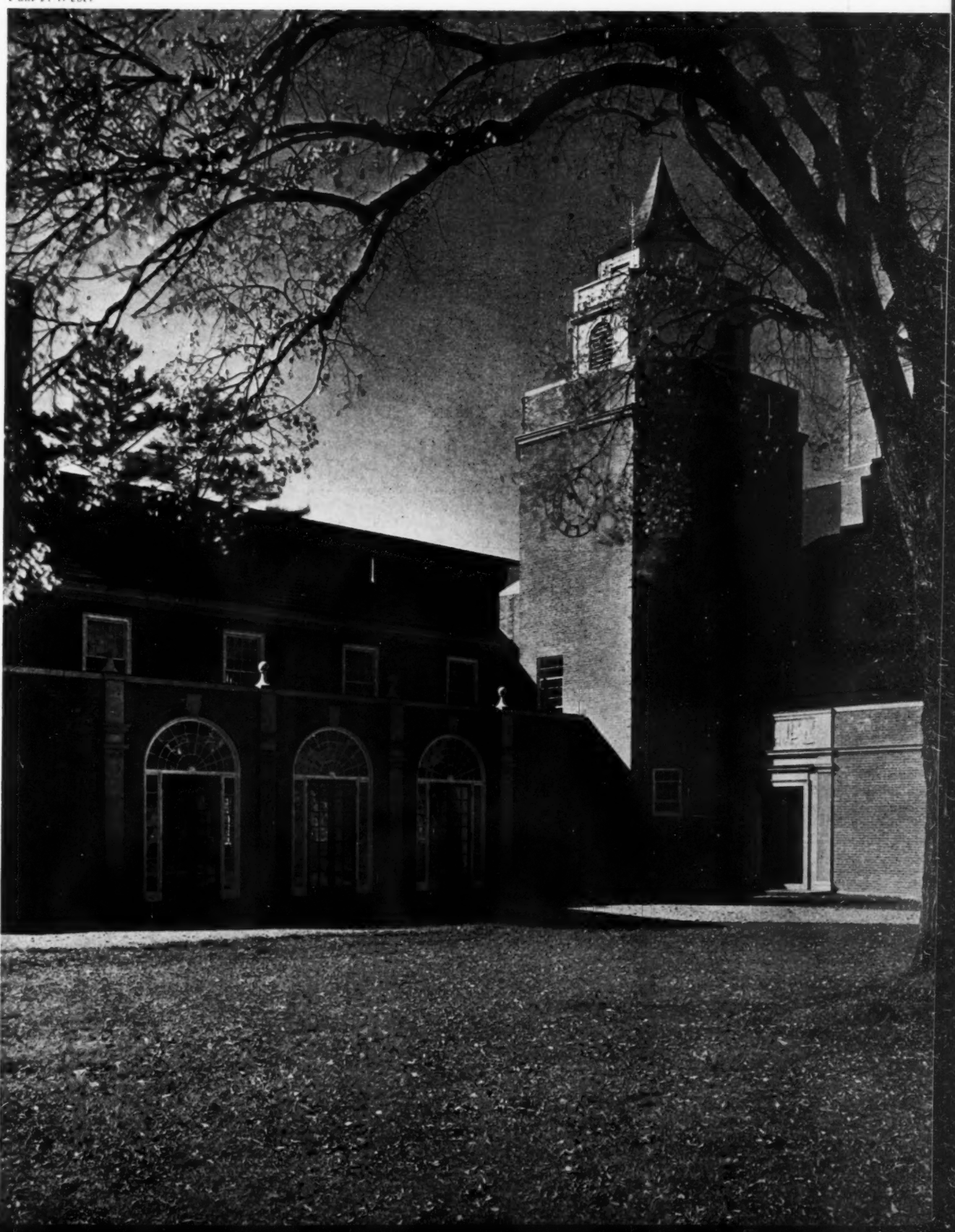
ESSEX COUNTY GIRLS VOCATIONAL SCHOOL AT NEWARK, NEW JERSEY



PORTFOLIO

SCHOOL BUILDINGS

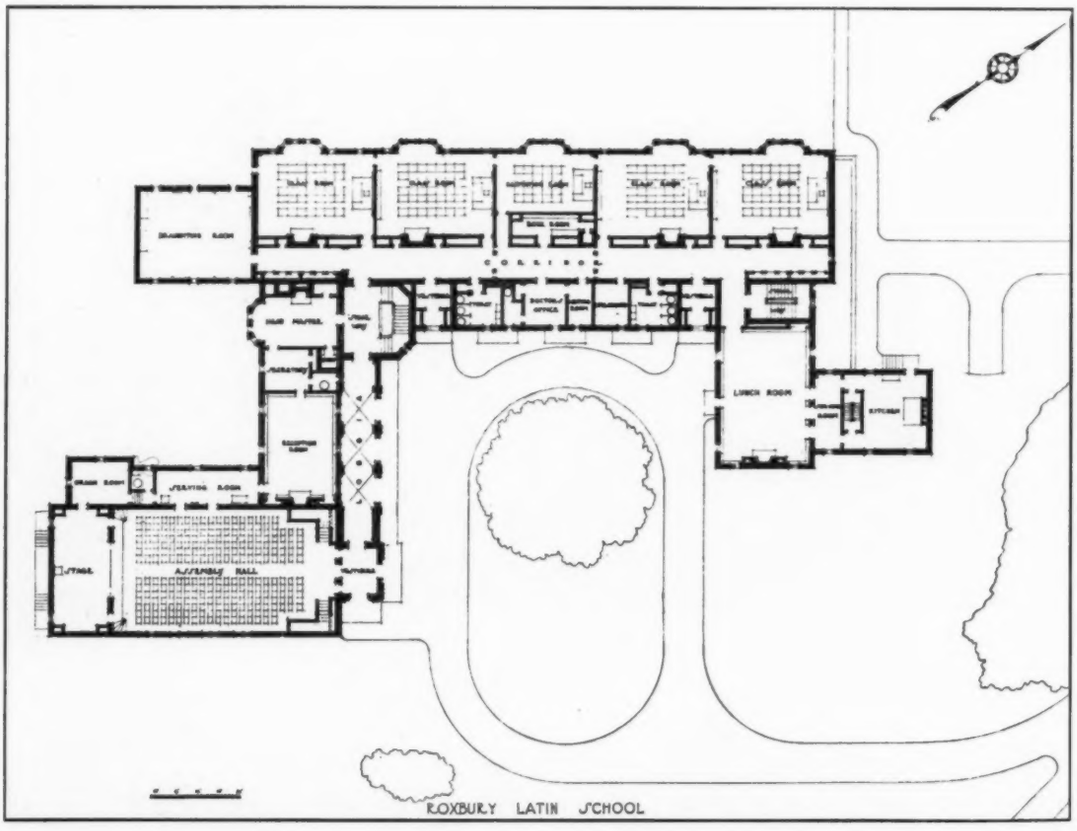
Paul J. Weber

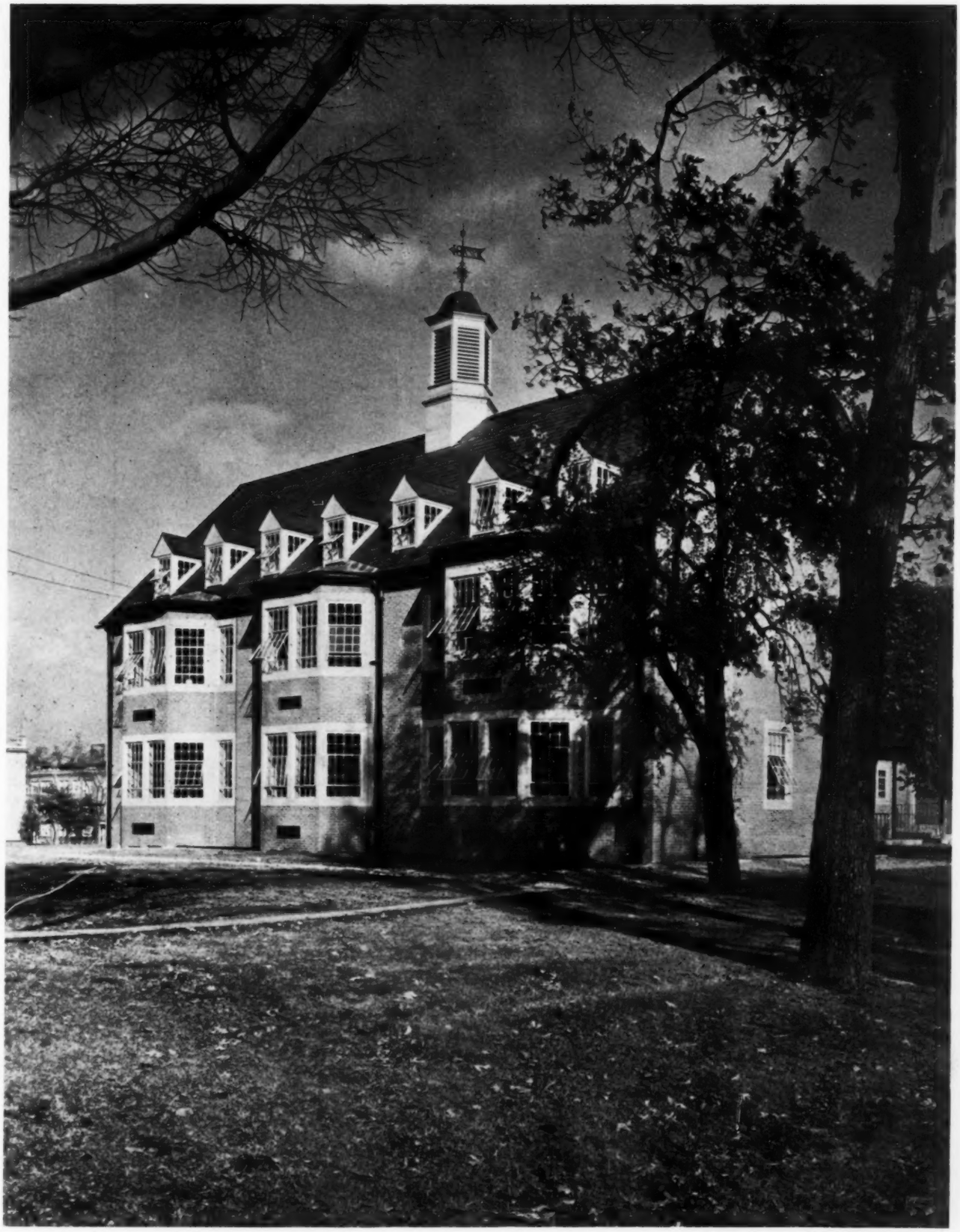


ROXBURY LATIN SCHOOL, ROXBURY, MASSACHUSETTS — PERRY, SHAW AND HEPBURN, ARCHITECTS

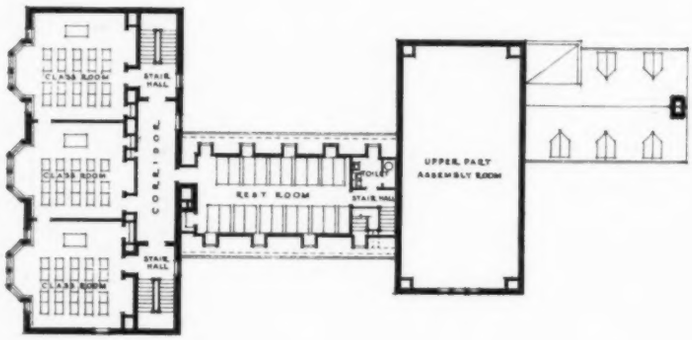
Photographs by Paul J. Weber

ROXBURY LATIN SCHOOL
ROXBURY, MASSACHUSETTS



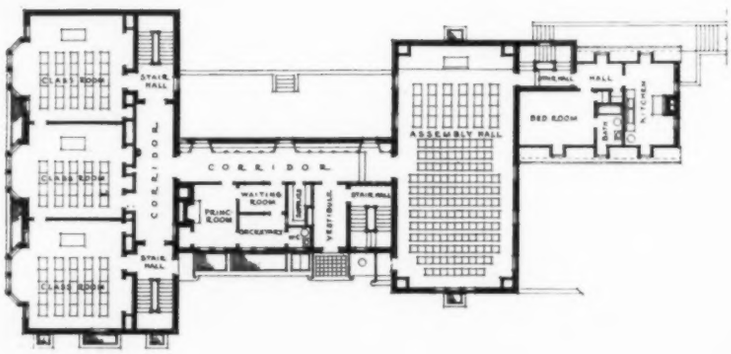


DEXTER SCHOOL AT BROOKLINE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

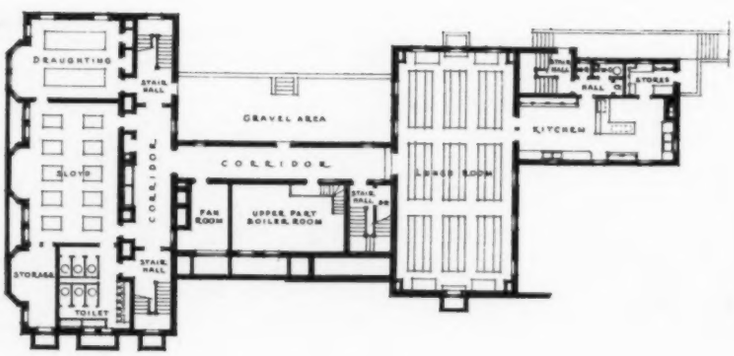


SECOND FLOOR PLAN

SCALE



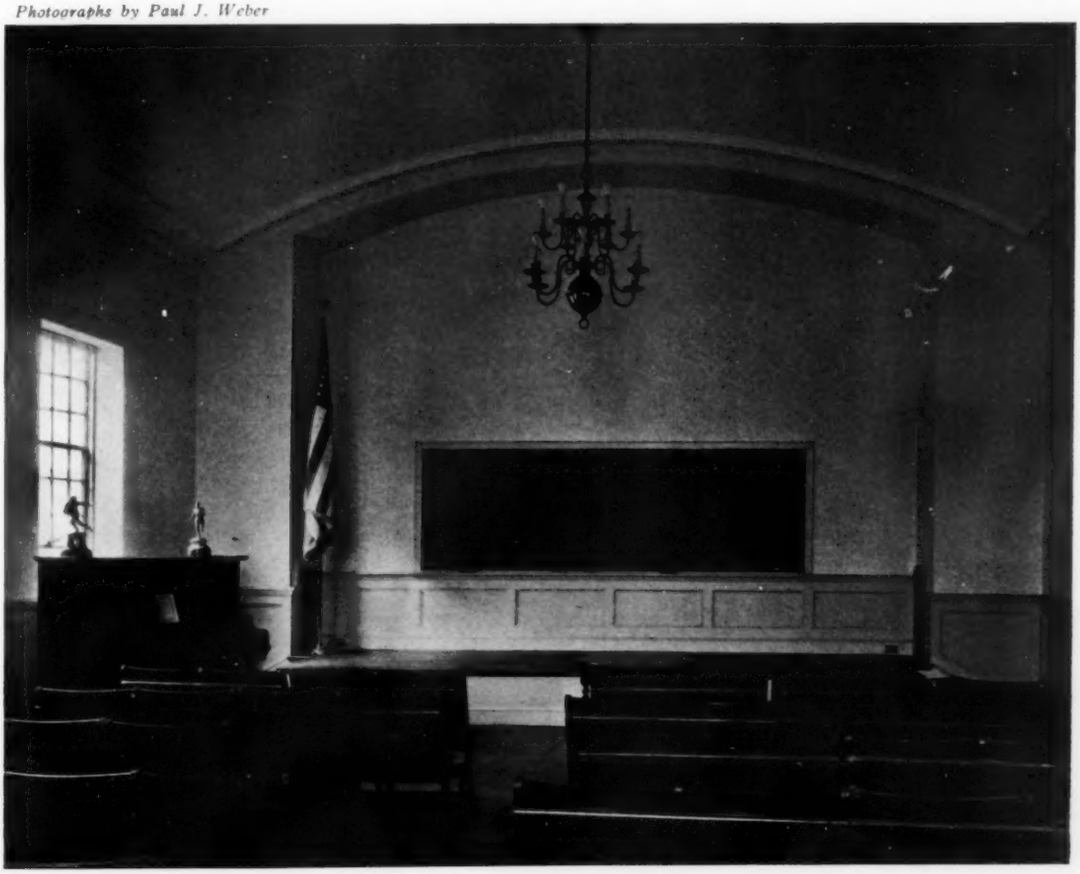
FIRST FLOOR PLAN



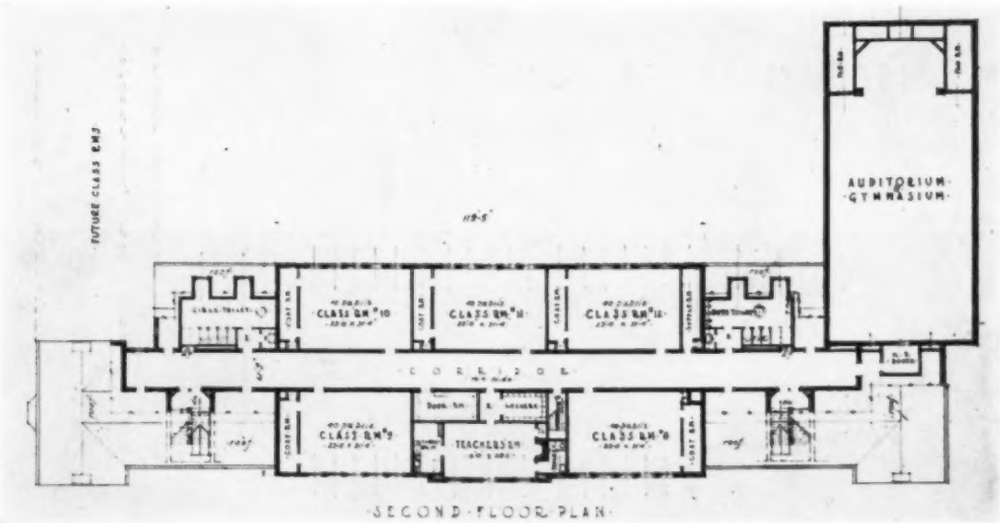
BASEMENT PLAN

DEXTER SCHOOL AT BROOKLINE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

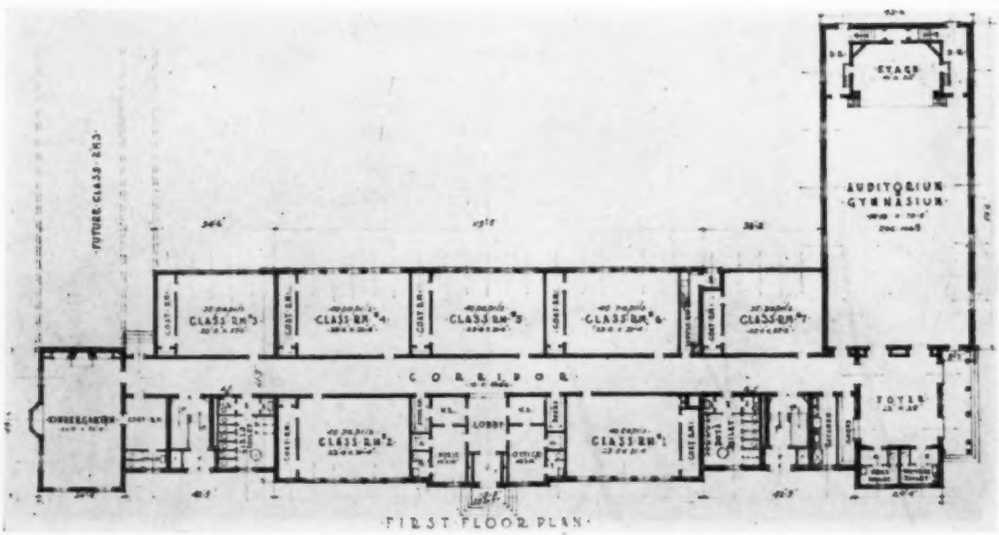
Photographs by Paul J. Weber



WOODROW WILSON GRADE SCHOOL — WESTFIELD, N. J.
COFFIN AND COFFIN, ARCHITECTS



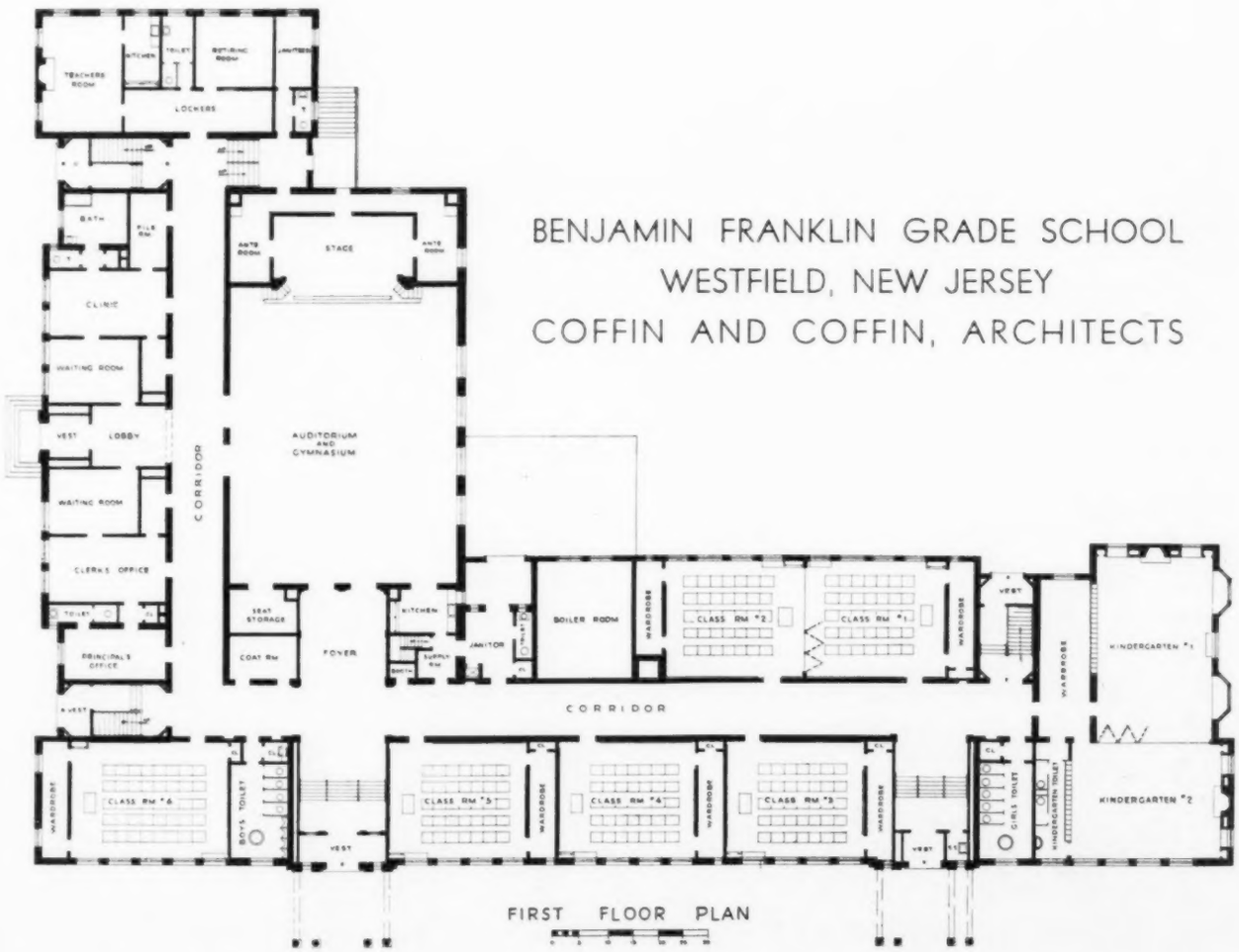
SECOND FLOOR PLAN

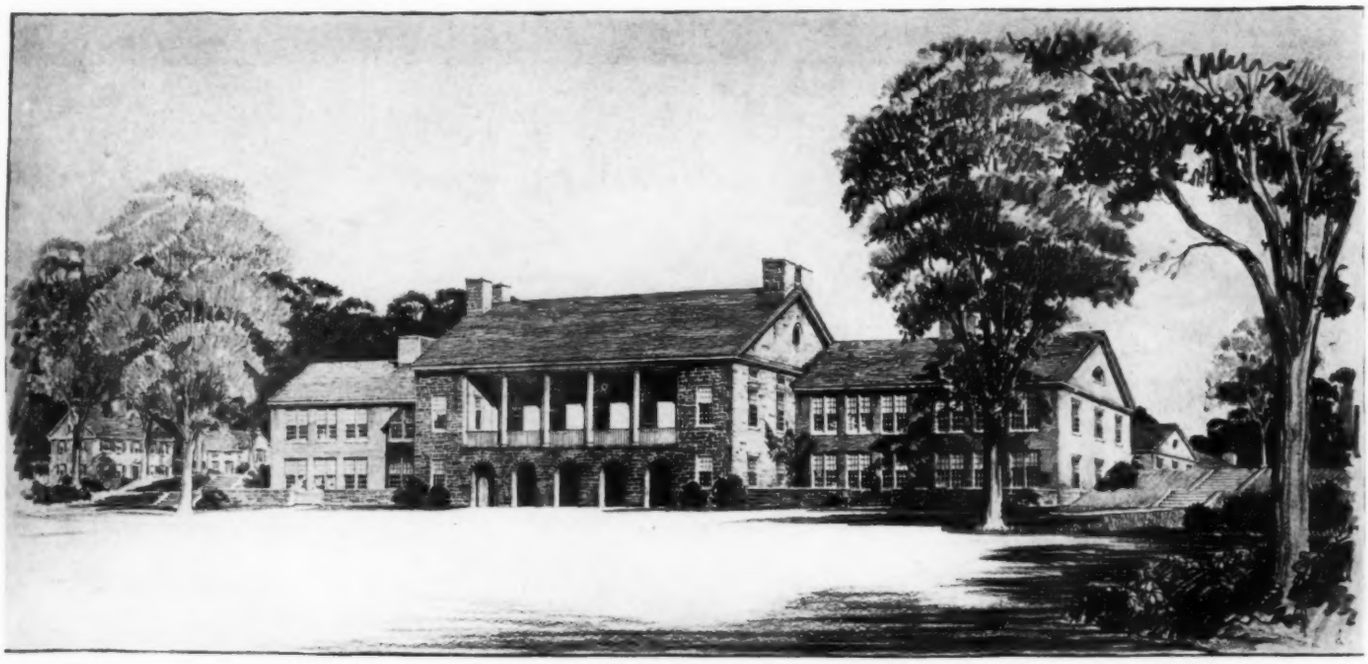


FIRST FLOOR PLAN

This school, a PWA project, is now under construction.

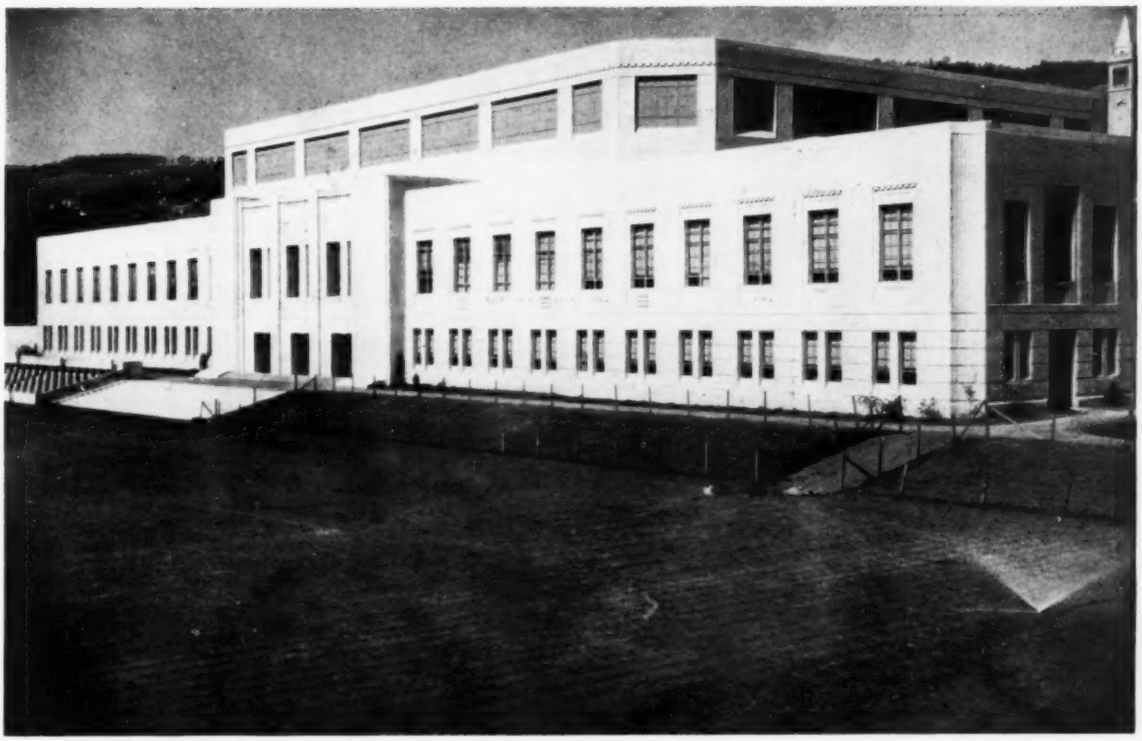
BENJAMIN FRANKLIN GRADE SCHOOL
WESTFIELD, NEW JERSEY
COFFIN AND COFFIN, ARCHITECTS



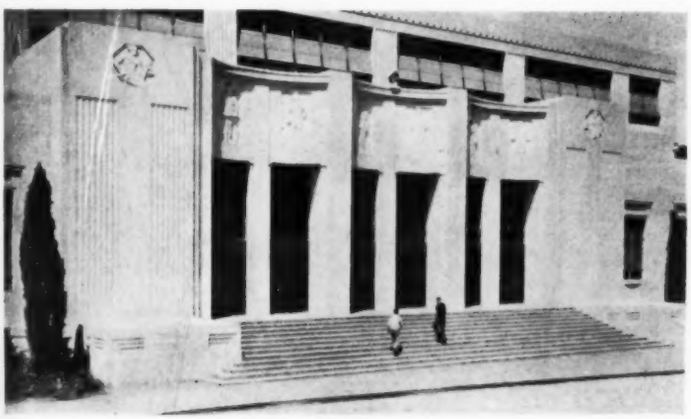


ERNEST SIBLEY, ARCHITECT
GEORGE M. CADY, ASSOCIATE

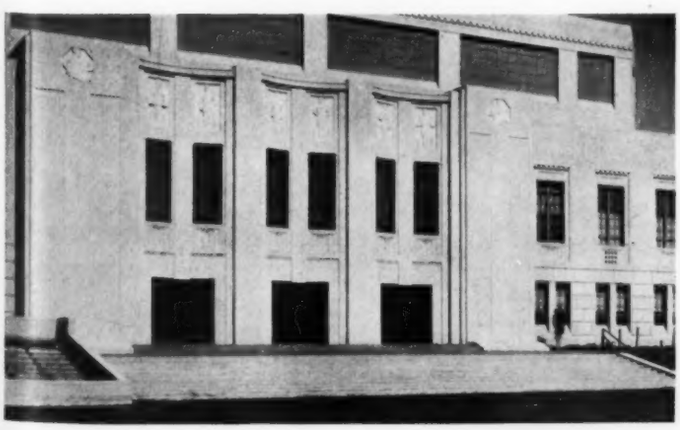
SOUTH MOUNTAIN ESTATES
ELEMENTARY SCHOOL
MILLBURN, NEW JERSEY



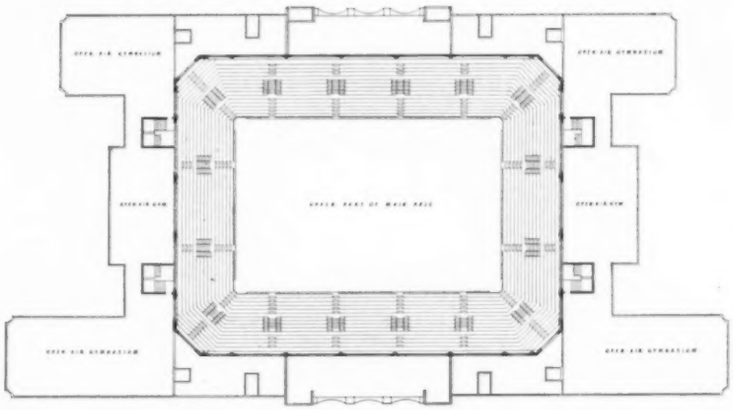
GYMNASIUM FOR MEN, UNIVERSITY OF CALIFORNIA (BERKELEY)



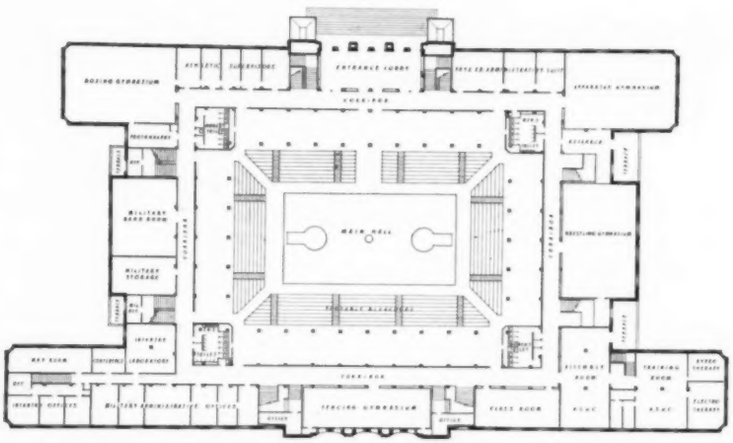
MAIN ENTRANCE DETAILS



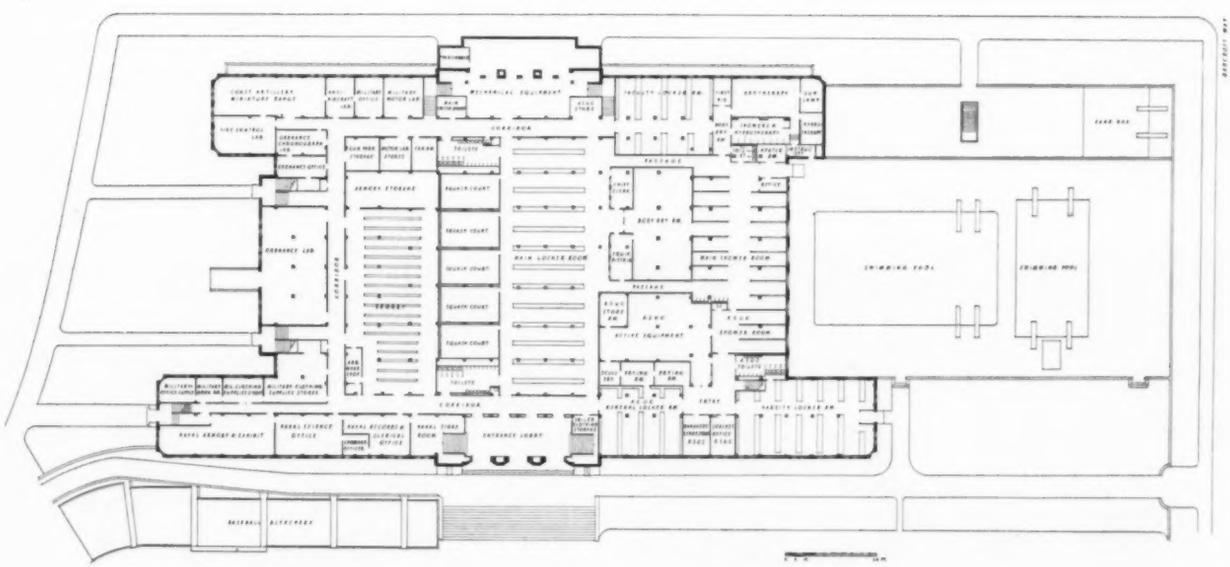
GEORGE W. KELHAM, ARCHITECT



BALCONY



FIRST FLOOR



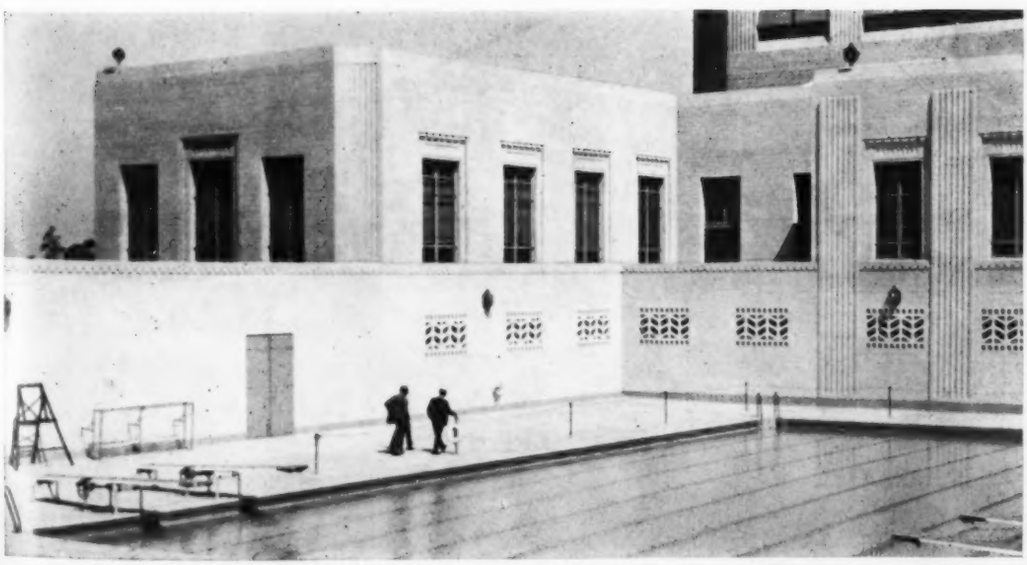
GROUND FLOOR

GYMNASIUM FOR MEN
UNIVERSITY OF CALIFORNIA
BERKELEY

GEORGE W. KELHAM
ARCHITECT

DETAIL OF WALL FACING POOL

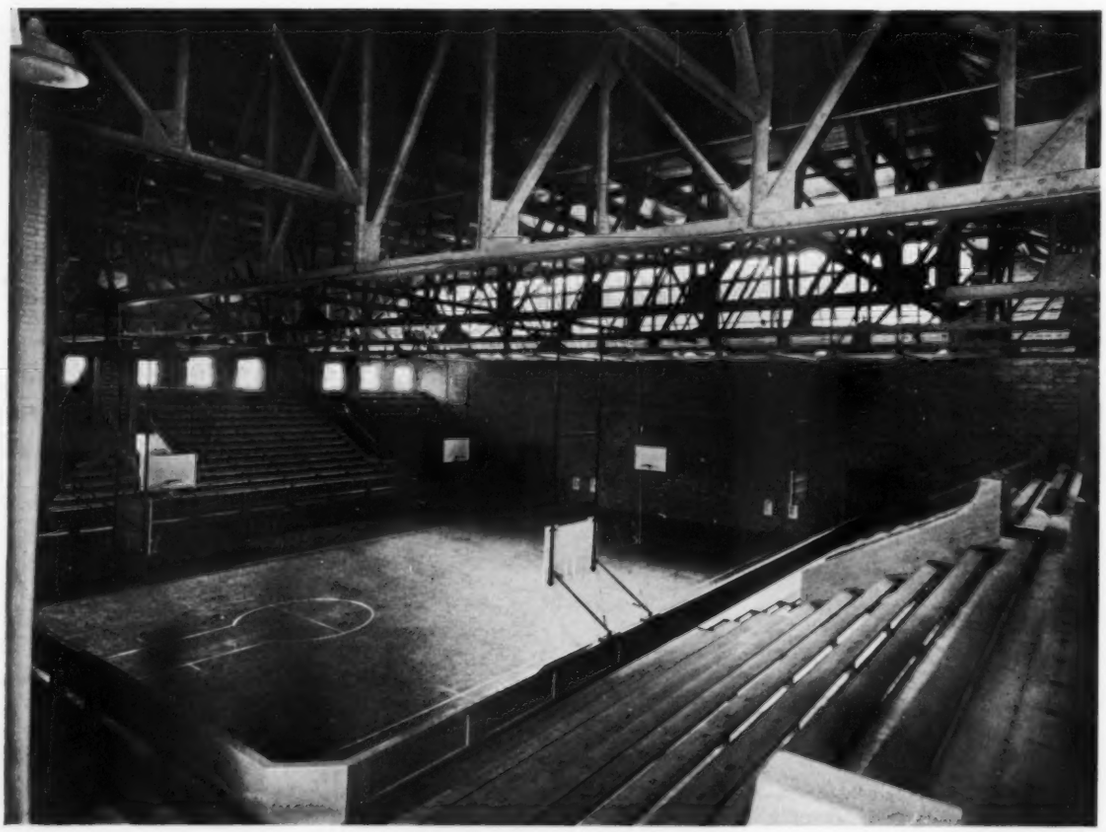
SWIMMING POOL AREA



GYMNASIUM

PHYSICAL EDUCATION BUILDING, MEN'S COLLEGE
GORDON AND

BASKETBALL ARENA



BASEBALL CAGE

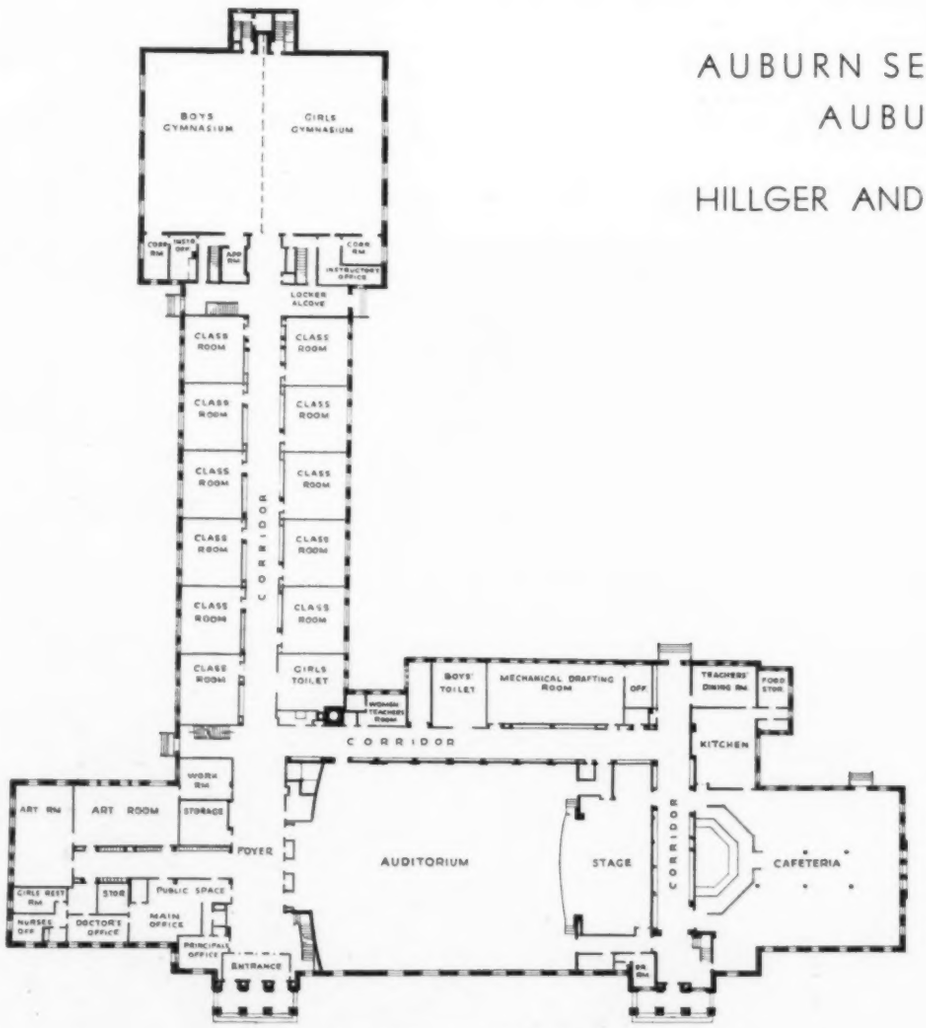
UNIVERSITY OF ROCHESTER, NEW YORK
KAELBER, ARCHITECTS

NATATORIUM

Bunnell Photographs

AUBURN SENIOR HIGH SCHOOL
AUBURN, NEW YORK

HILLGER AND BEARDSLEY, ARCHITECTS



FIRST FLOOR PLAN

AUDITORIUM

The first requirement was for a friendly building where the children would be glad of their school hours, not dreading them. Therefore the building was set low to the ground with many easy entrances.

Old Virginia brick was combined with a cast stone tinted a warm buff. The tile and marbles and terrazzo inside were selected for their warmth of color. The plaster throughout was tinted a soft buff. The acoustical treatment of the corridors, the gymnasium, the library, study hall, and many classrooms has likewise turned the time spent in "keeping order" to productive work in education. Motors and similar equipment are carefully insulated and the innumerable ventilation motors and fans function without any one's awareness.

The general arrangement allows supervision of each floor by only one person. The disturbing elements—music room, cafeteria and gymnasium—are kept away from the classrooms, auditorium and library.

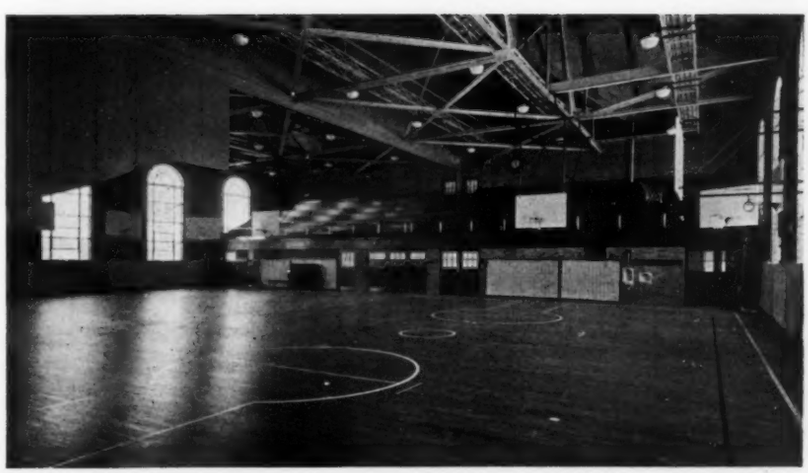
The gymnasium unit has a large folding door 98'-9" long and 23'-6" high. It is designed to slide over and completely divide the balcony bleachers as well as the main gymnasium floor.

The possibility of extending the building into a final hollow square plan when necessary is provided for. However, the present plan, designed for one thousand pupils, has proved so flexible that 1,150 pupils are now comfortably accommodated.

The auditorium seats 1,468, so that it is large enough not only for the school but as a much-needed community auditorium. It has a full-sized stage with full-height grid, skylight and sprinklers.

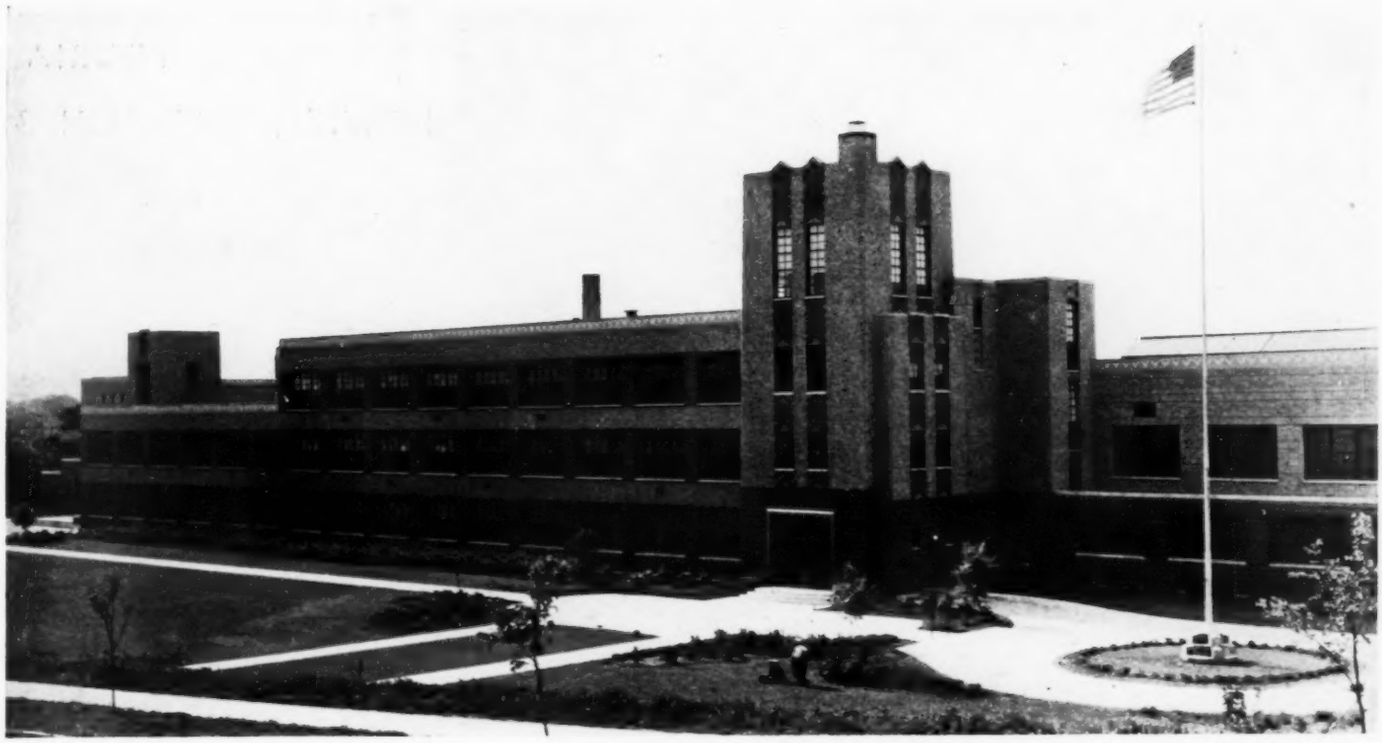
LIBRARY

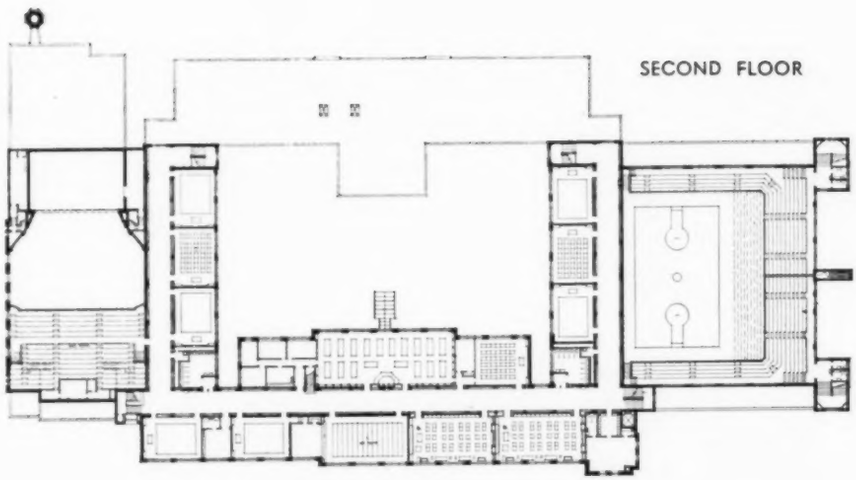
GYMNASIUM

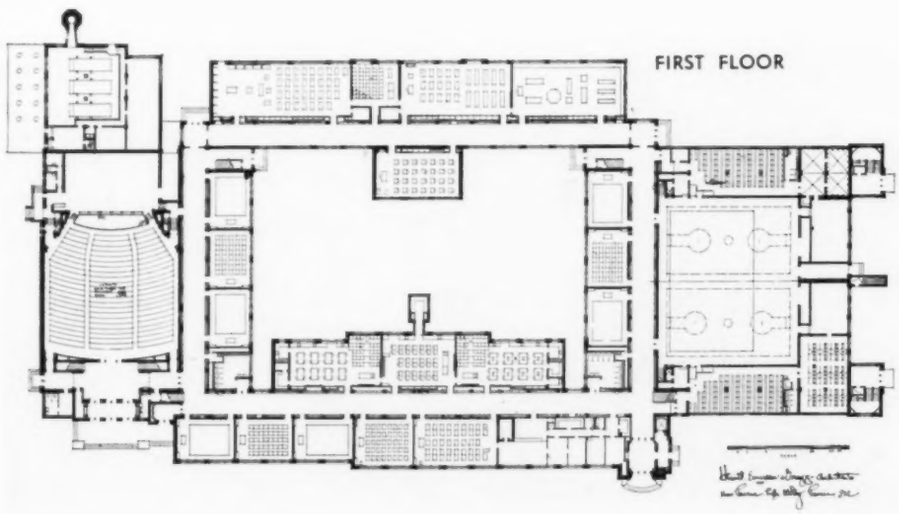


THEODORE ROOSEVELT
JUNIOR HIGH SCHOOL
PEORIA
ILLINOIS

HEWITT, EMERSON &
GREGG, ARCHITECTS







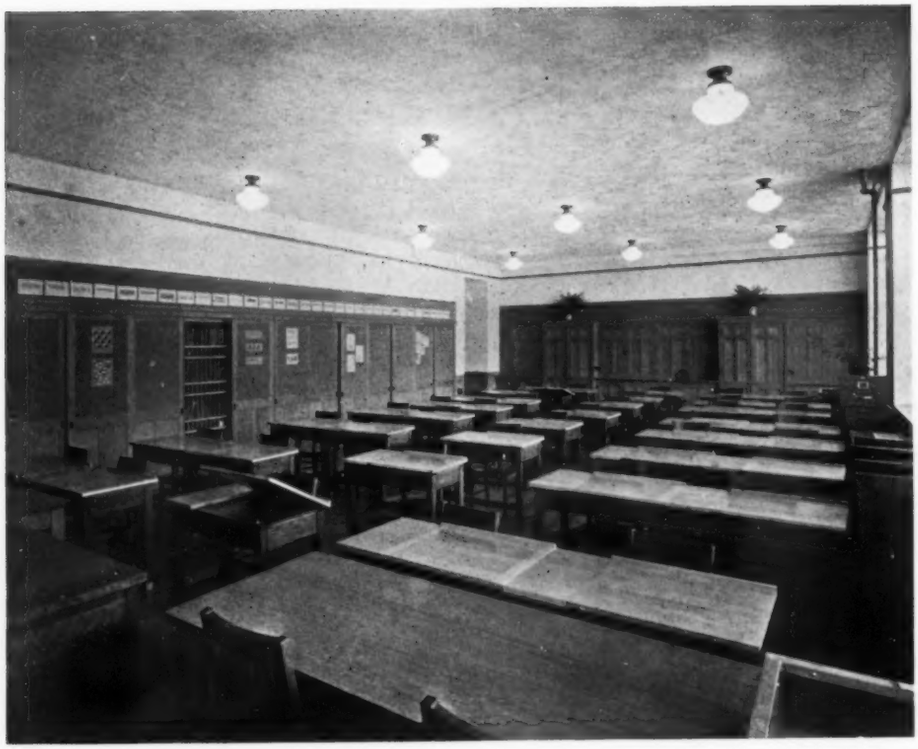
The plan is divided into four units: auditorium, classroom, gymnasium, and shop, placed on four sides of a large interior court. The units are connected by corridors and entrances and are so arranged that any unit can be used independently of the others.

The total number of stations, including gymnasium classes, is 1,664. Over-all dimensions of building: 450′ x 232′. Total cubage: 2,444,362 cubic feet. Cost without equipment: $635,000. Cost per cubic foot: 26¢. Cost per pupil: $394.

Auditorium has 1,206 opera chairs. Seating around playing floor in double gymnasium is 1,200, with 500 additional seats in portable bleachers when required. Playing space in gymnasium: 90′ x 75′.

The building is fireproof throughout, with reinforced concrete floor construction. The exterior has two shades of brick with polychrome terra cotta trim. The main entrance is polished red granite with polished white metal grilles.

THEODORE ROOSEVELT
PEORIA,
HEWITT, EMERSON &

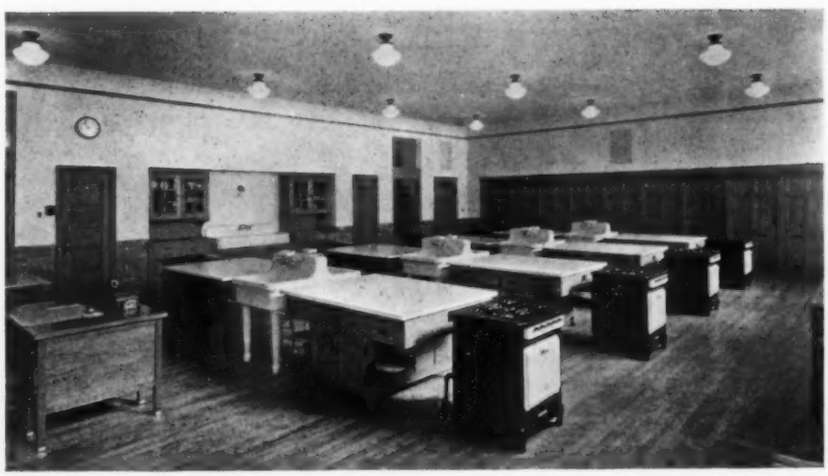


ART ROOM

ELECTRIC SHOP:

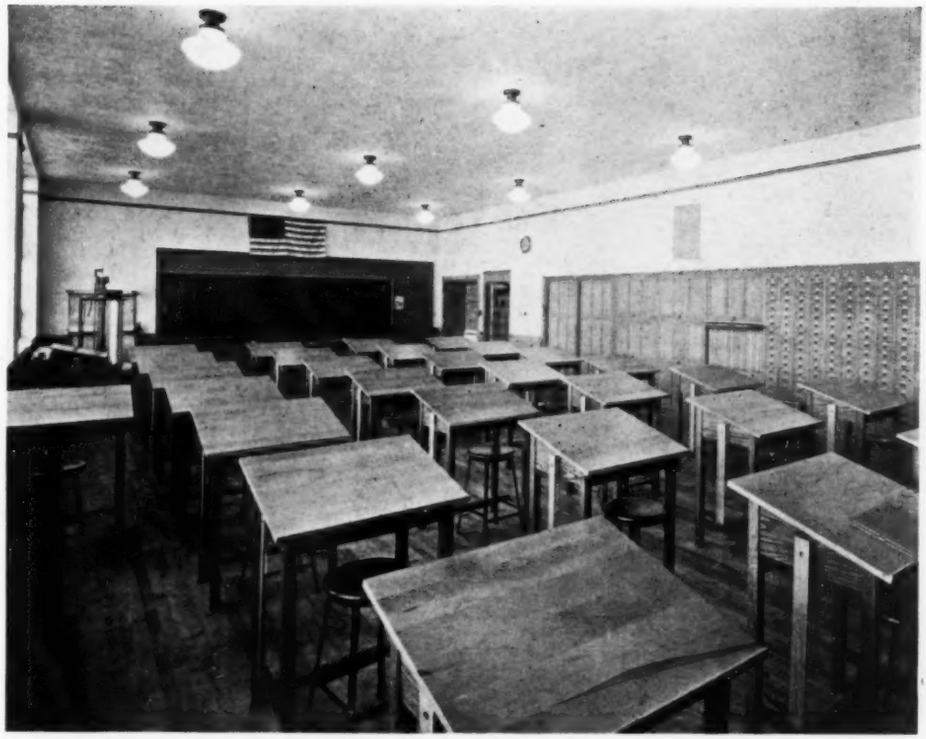
Creosote wood block floor. Common brick walls and structural concrete ceiling painted. Built-in cases for supplies.

DOMESTIC SCIENCE ROOM

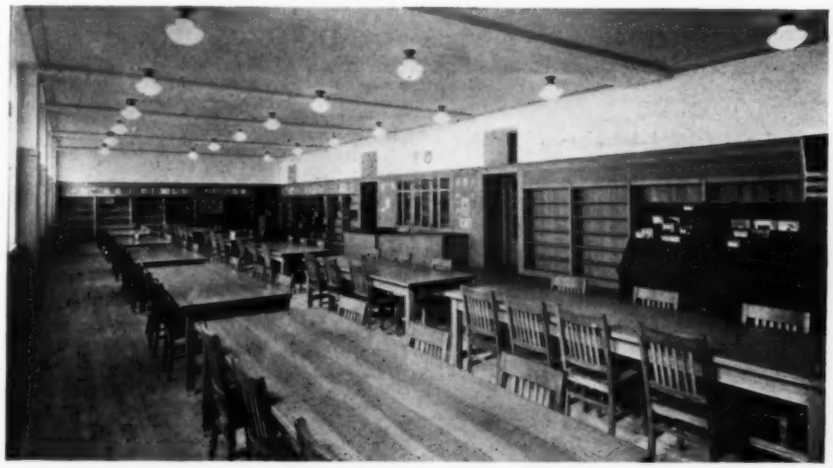


JUNIOR HIGH SCHOOL
ILLINOIS

GREGG, ARCHITECTS



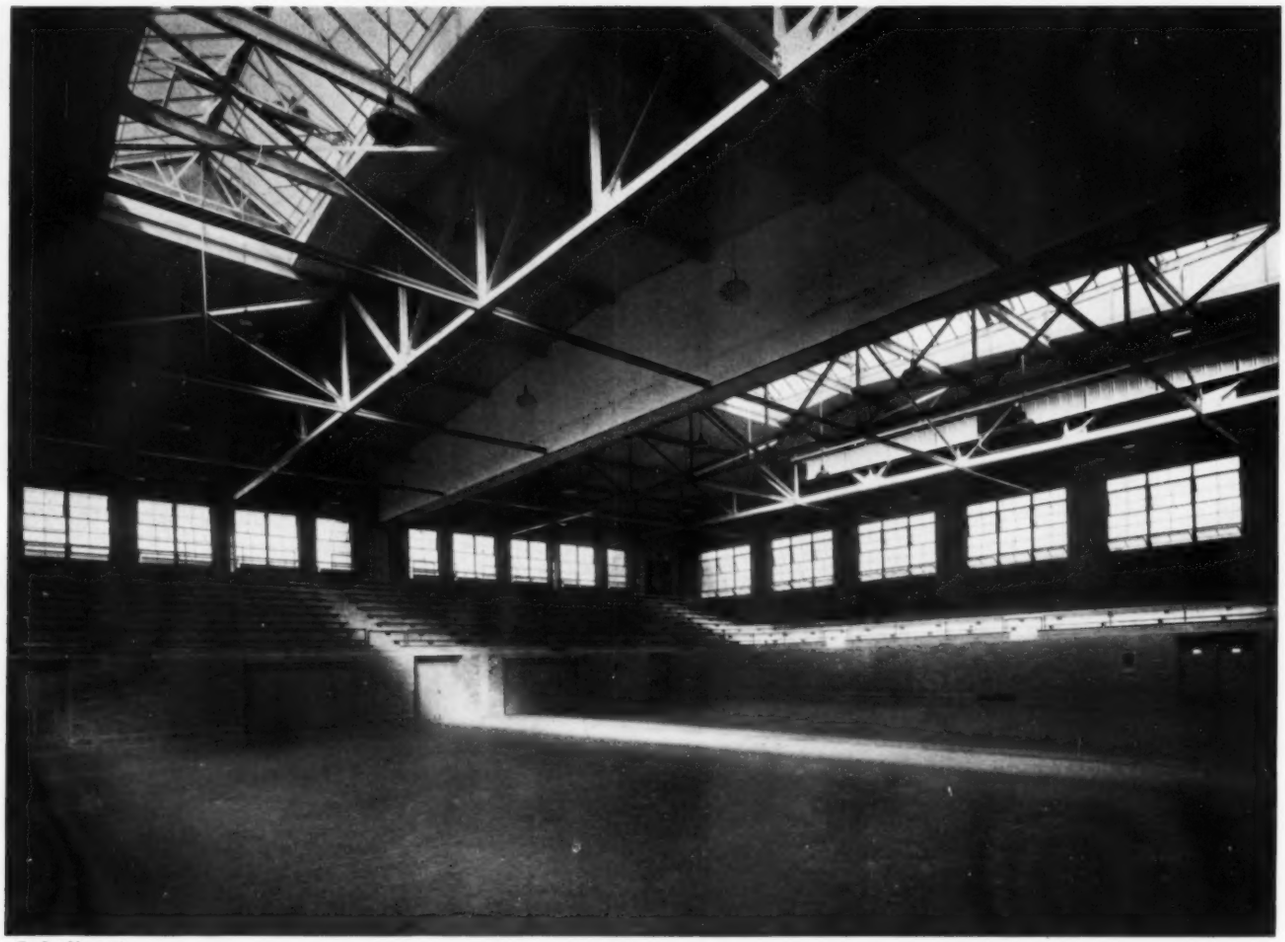
MECHANICAL DRAWING ROOM



LIBRARY:

Maple flooring. Plain red oak wainscot, random width "V" matched boards. Beveled Insulite (acoustic) tile paneled ceiling.

SCIENCE LABORATORY

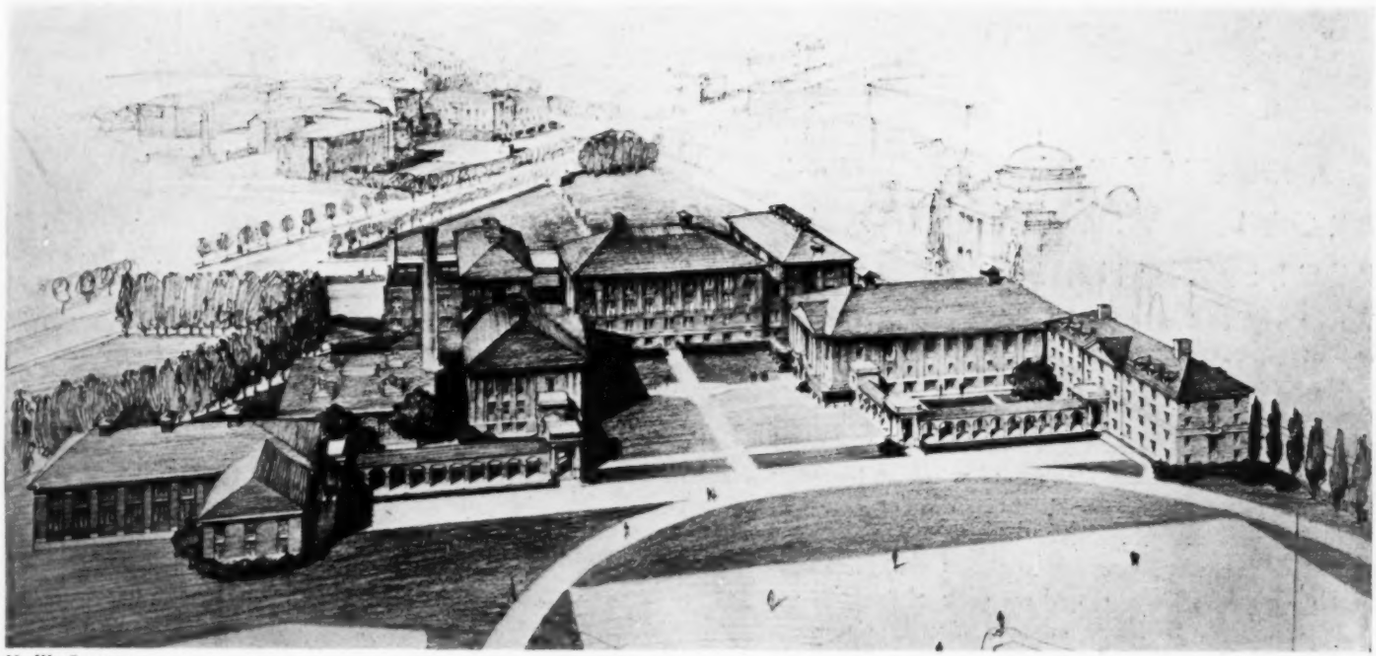


G. L. Venard

GYMNASIUM: Asphalt tile floor. Glazed brick walls. Celotex ceiling. Concrete bleachers.

BOYS: LOCKER ROOM:
Colored cement floor. Glazed brick walls. Plaster ceiling. Unit heaters with air supply from gymnasium. Exhaust fans on lockers.

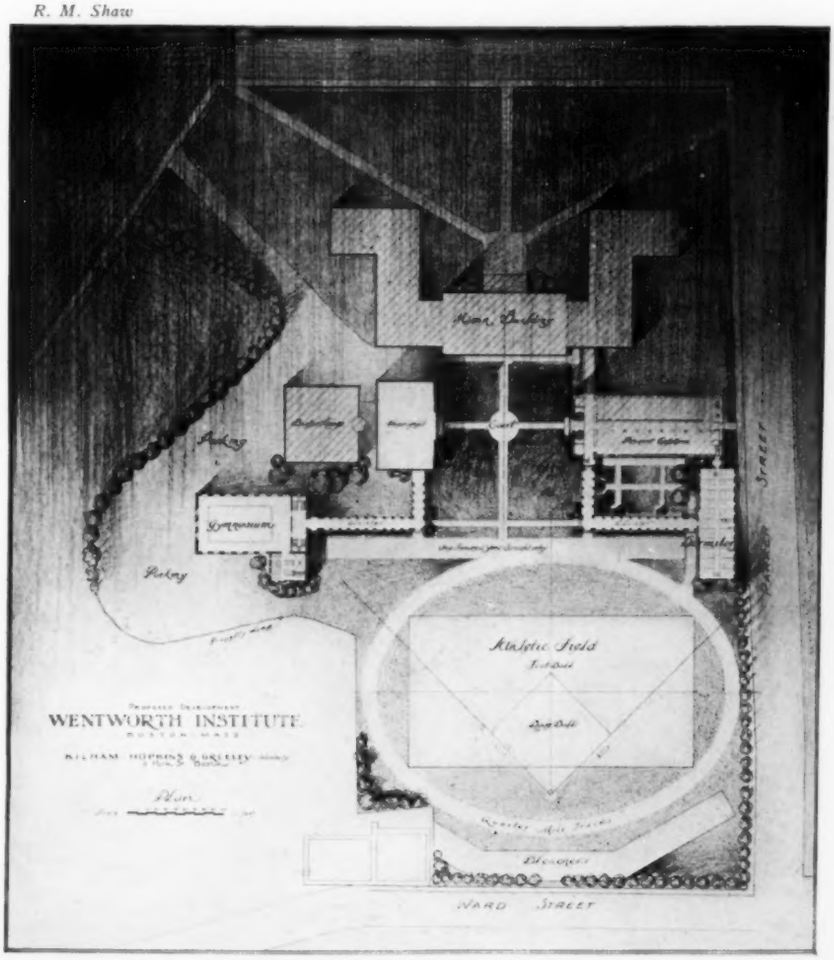
HEWITT, EMERSON & GREGG, ARCHITECTS



M. W. Sampson

PROPOSED DEVELOPMENT OF WENTWORTH INSTITUTE, BOSTON
KILHAM, HOPKINS AND GREELEY, ARCHITECTS

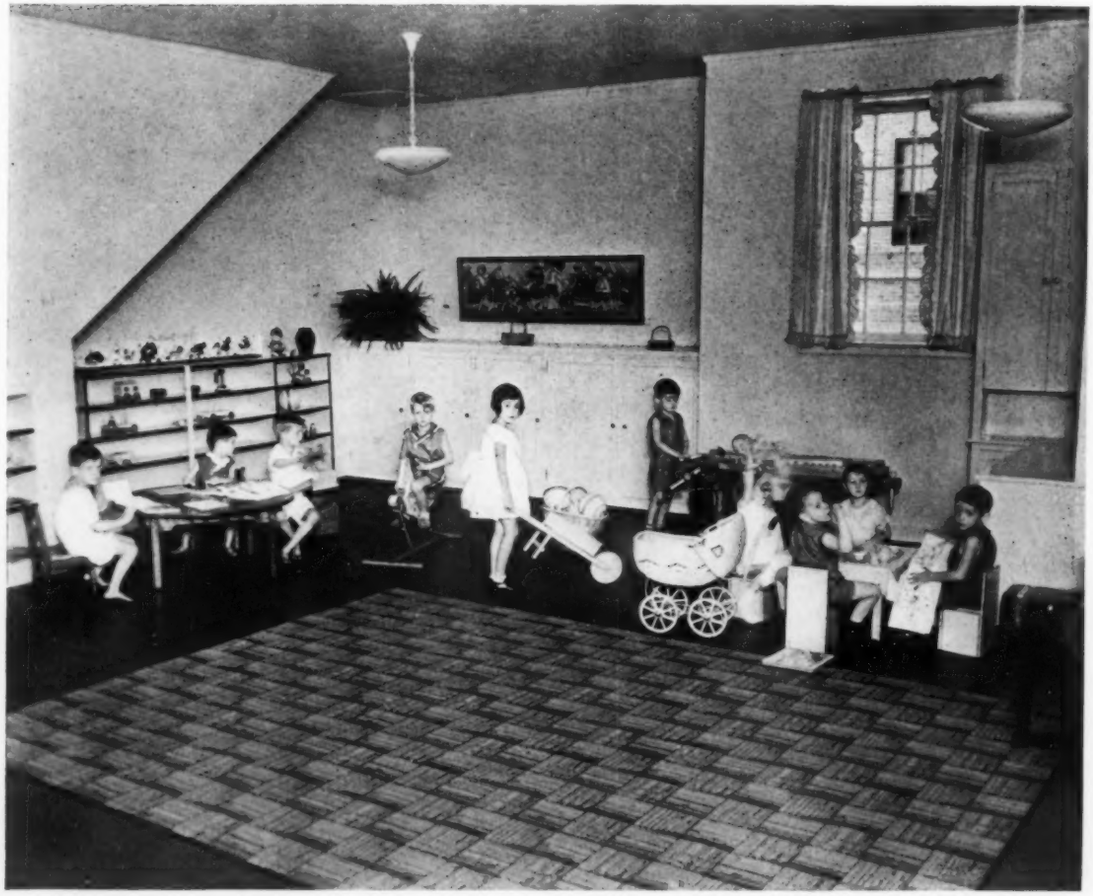
R. M. Shaw



GARDEN APARTMENTS PROVIDE SCHOOL AND RECREATIONAL ACTIVITIES

The purpose of the Marshall Field Garden Apartments in Chicago, completed in 1927, was to provide moderate-priced living quarters to a selected tenancy close to the downtown section. This involved building in an area where surroundings were not of the standards desired within the apartments. Under the direction of Manager A. J. Parkin, a community has been developed within the tenancy. A model school for children of tenants was provided through the cooperation of the Pestalozzi-Froebel Teachers College, and recreational facilities for both children and adults are available in the playgrounds, baseball field, woodworking shops and auditorium. Dramatic programs, dances and card parties are held regularly. The shops serve as a place for tenants both to pursue their hobbies and to make or repair furniture.

Parents who work can have their children at school.



Apartments on two floors, with south and east frontage, have been remodeled for school and playrooms such as this.

Inclosed playgrounds under care of trained supervisors keep the children off streets.

SCHOOL AND RECREATIONAL FACILITIES MARSHALL FIELD GARDEN APARTMENTS IN CHICAGO

The garden court provides out-door school activities in season.

A corner of one of the schoolrooms, equipped with child's size furniture, educational toys and facilities for kindergarten and primary school education.

A boy's workshop provides a place for older boys who are not in the kindergarten or primary classes.

Working benches and tools are part of the school equipment, and are used both in classes and in play-time activities.

MARSHALL FIELD GARDEN APARTMENTS CHICAGO

WAS THE HOME INSURANCE BUILDING IN CHICAGO THE FIRST SKYSCRAPER OF SKELETON CONSTRUCTION?

Before the 47-year-old Home Insurance Building, located on the northeast corner of LaSalle and Adams Streets in Chicago, was razed to make way for the new Field Building (published in this issue, pages 119-128), a committee of architects and others was appointed by the Marshall Field Estate to decide if it was entitled to the distinction of being the world's first skyscraper. This committee, after a thorough investigation, handed down a verdict that it was unquestionably the first building of skeleton construction.

The committee's decision, however, is challenged by Irving K. Pond, Chicago architect, who had first-hand experience in the construction work of that period. Mr. Pond argues that the structure of the original Home Insurance had little in common with modern skeleton construction, and little or no influence on skyscraper design.

Both sides in the controversy are presented herewith, and the reader is free to make his own decision.

REPORT OF THE INVESTIGATING COMMITTEE

The plan of the old building was first examined (October 9, 1931) and then daily inspection visits were made during the demolition period (October 9 - November 1). Careful measurements were made at a typical floor of columns and connections on the exterior, court and interior. Drawings were made of these measurements. At the committee's request W. J. Newman & Company, the wrecking contractor, exposed the metal framing in special ways for inspection and for photographs.

Members of the committee who reported the investigation were Thomas E. Tallmadge, chairman; Ernest R. Graham, Alfred Shaw, Earl H. Reed, Andrew Rebori, Benjamin H. Marshall, Richard R. Schmidt, architects; Charles B. Pike, President, Chicago Historical Society; Mark Levy, President, Chicago Real Estate Board; and O. T. Kreusser, Director, Rosenwald Museum.

Their report follows:

* * *

The Committee at its first meeting determined that its program would be,

First, to define "skeleton construction."

Second, to determine what, if any, priority the Home Insurance Building held over any building of similar construction, and

Third, to determine the nature and extent of the use of "skeleton construction" in the Home Insurance Building.

We feel that although not an essential part of this report, a brief statement as to the importance of skeleton construction and its part in the development of American and World architecture in the last fifty years will not be irrelevant. It has been stated many times and we believe it to be true, that the greatest contribution of America to architecture is the skyscraper. By skyscraper is meant a building that exceeds in height the practical limit of solid masonry construction. The absolute and first essential in the structural creation of the skyscraper is the

Chicago Architectural Photographing Co.

A special committee, after investigation, has handed down a verdict that the 47-year-old Home Insurance Building, razed to make way for the new Field Building, was unquestionably the first building of skeleton construction and can claim the title of "Father of the Skyscraper." The building was designed by William LeBaron Jenney, who got his idea for skeleton construction from bamboo huts in the Philippines.

Members of the committee, left to right: (seated) A. N. Rebori, Ernest R. Graham, W. B. Mundie, architects; Lou R. Crandall, contractor: (standing) George Richardson, trustee, Marshall Field Estate; Earl H. Reed, Jr., architect; Mark Levy, president, Chicago Real Estate Board; O. T. Kreusser, director of the Rosenwald Museum of Science and Industry; Richard E. Schmidt, and Howard J. White, architects.

(Left) Committee examining exposed column of the fifth floor of the Home Insurance Building. (Right) Close-up of head of column at fifth floor level, LaSalle Street front, showing wrought-iron floor girders and cast-iron lintel in place with the spandrel I-beams removed.

metal (ferrous) skeleton. The economic essential is the high-speed elevator. It follows, therefore, that the vast number of skyscrapers that have been built and are being built might be derived from and be dependent on the first building of this nature that was erected. If, therefore, it be found that the Home Insurance Building is the first skyscraper as above defined, its importance in architectural history is enormous, for the sequence of skyscrapers from 1884 is very well known and there is no claim that at this time or later was any skyscraper built independently and without knowledge of the peculiar construction of the Home Insurance Building.

The value of skyscrapers built in the United States since 1884 to the present time runs into billions of dollars. Their value in the economic development of the country and in the aesthetic development of architecture is inestimable.

DEFINITION

Webster's Dictionary describes skeleton construction as "a method of constructing buildings in which the chief members are of steel the wall being supported at the floor levels by the steel frame itself."

The *Encyclopaedia Britannica* says that in skeleton construction "steel takes up all the stresses to which a building is subjected; compression, tensile and shear."

We may also turn for authority to technical works on engineering and architecture. Russel Sturgis in the *Dictionary of Architecture* defines skeleton construction as "a manner of building in which, while the exterior is of masonry, the whole structure is of iron or steel which supports the exterior walls as well as the roof." In *Architectural Engineering* (J. K. Freitag, 1901) a distinction is made between "skeleton" and "cage" construction as follows: "a skeleton or simple framework of beams and columns depends largely for its efficiency upon the exterior and interior walls and partitions which serve to brace the structure and which render the skeleton efficient much as the muscles and covering of the human skeleton make possible the effective service of the component bones." While "cage" construction "partakes more of the character of a single unit so far as the steel is concerned for the framework is made complete in itself . . . and independent of any considerations as to aid or support from any external coverings." In other words, according to Freitag, where the metal frame depends on a certain amount of bracing from interior or exterior masonry walls it is "skeleton construction." Where all necessary bracing is furnished by metal members it is "cage." In this report the terms "skeleton and cage" will be regarded as synonymous.

The Chicago Building Ordinance states, "The term skeleton construction shall apply to all buildings wherein all external and internal loads and strains are transmitted from the top of the building to the foundations by a skeleton or framework of metal." There are many other descriptions from various sources but the purport of all of them is that in skeleton construction there is a cage or skeleton of metal which supports all interior and exterior loads, in other words, the floors, walls and live loads.

The Committee, at its first meeting, October 9, 1931, adopted the following as its definition of skeleton construction. "A type of construction in which a metal frame or cage composed of girders, beams and columns supports all internal and external loads and carries all stresses directly to the foundations." This definition does not require that such strains as wind pressure be taken up exclusively in the metal skeleton, neither does it include any particular type of foundation, nor require that the foundation be entirely underground.

PRIORITY

To substantiate the claim of any building or person to the honor of being the originator of skeleton construction, priority must first of all be proved. Our investigations show that although there are a number of buildings in which an iron frame has been used in one way or another, there are only three whose claims for authorship seem in any way to be justified. Before mentioning these, we will cite at this point several of the others whose claims did not seem worthy of more than a brief consideration:

(Left) This picture, taken from the street, shows stripped column near third floor level. (Center) Masonry removed from exterior columns demonstrates that the walls were supported by columns. (Right) Head of a column at the fifth floor level.

Of early buildings which used in one form or another metal frames or skeletons, and which thus made their contributions to the development of structural iron, there should be mentioned the Crystal Palace, 1851, and subsequent Exhibitions Buildings, particularly those of the Centennial Exposition in 1876.* There was also a 5-story factory built in 1872 at Noisiel, Seine and Marne, of a decorative iron skeleton of T bars in lozenge fashion exposed in the exterior; the open spaces of which were filled with brick and tile in ornamental patterns. Sturgis calls this a true example of skeleton construction. N. D. Morgan, in the *Western Architect* of March, 1926, states that in 1881 George B. Post, in the Produce Exchange Building (in the light court), used iron skeleton construction in a "limited sense."

Montgomery Schuyler in *Scribner's Magazine* says that in the Produce Exchange building, "an example not only of 'cage' construction but of 'skeleton' construction in the interior court was achieved." Number 50 Broadway, New York City, a very narrow building whose floors were spanned by girders from party wall to party hall, had a bronze inscription which stated, "the earliest example of skeleton construction in which the entire weight of the walls and floors is borne and transmitted to the foundation by a framework of metallic parts and beams, date 1888-9." This building is clearly outdated, according to its own record by the Home Insurance Building.

The claims we will discuss in detail are those of the Home Insurance Building (demolished), William LeBaron Jenney, architect; the Tacoma Building (demolished), Chicago, Holabird and Roche, architects; and the letters patent of Leroy S. Buffington. Considering these in reverse order—

Mr. Buffington, an architect of Minneapolis well known in his profession,† in reading an essay by Viollet-le-Duc, was struck by a statement of the great Frenchman that with an iron frame buildings could be built to an unlimited height. Based on this idea, he secured, May 22, 1888, letters patent covering an iron frame for tall buildings. This iron frame was essentially different from any that was used subsequently. The columns, for example, were solidly composed of iron slabs staggered and bolted together, a design impossible in a practical application. In 1884, Buffington designed a 16-story building with a frame of cast-iron columns and iron beams in which the curtain walls were supported at each floor by the iron beams. This building, however, was never built, at least with this form of construction. In 1888, he made a perspective design for a 28-story skeleton building which he called a "cloud scraper." Although Buffington never built a skeleton building, he attempted through the courts to collect royalties on various others that had been built as infringements of his patents. In every instance he lost his suit though the owners of the Rand Tower, Minneapolis, built in 1928, voluntarily paid him one-eighth of one per cent of the cost of the steelwork.

The Tacoma Building, demolished in 1929, stood at the northeast corner of LaSalle and Madison Streets, Chicago. It was built from plans of Holabird and Roche. The building was started on May 1, 1887, and finished July 1, 1888. In the case of the Tacoma Building the claim has usually been made that it was the first skyscraper ever erected in which skeleton construction was used throughout or that it was the first "complete" example of skeleton construction. Holabird and Root, successors, in a published letter** say "The construction is cast-iron supporting columns, cast-iron spandrel lintels, wrought-iron girders and beams, hollow tile arches and spread foundations made of concrete reinforced with railroad rails." Freitag in *Architectural Engineering* refers to the Tacoma Building as "probably the first complete type of skeleton construction." George E. Pistor, treasurer of the American Institute of Steel Construction,‡ "The Tacoma building . . . was supported entirely by a metal frame and the walls did not more than curtain off the elements."

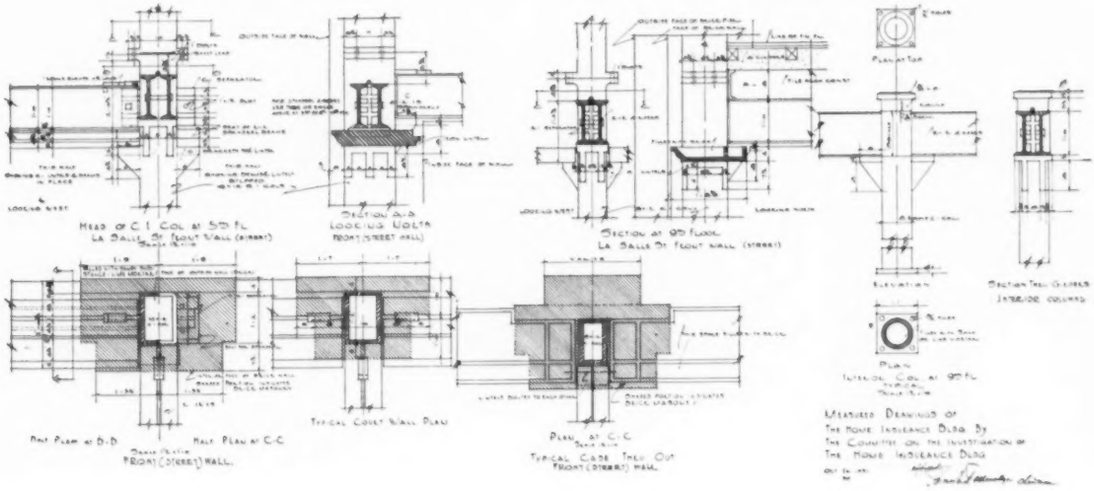
*Illustrated in *Dictionary of Architecture*, Russel Sturgis.

†Obituary of LeRoy S. Buffington by Robert Craik McLean, *Western Architect*, March 1931.

**Story of Architecture in America, p. 179.

‡*Traces Evolution of Skyscrapers*. The Associated Builders of Chicago.

STRUCTURAL DETAILS OF THE HOME INSURANCE BUILDING



The *Story of Architecture in America* captions a picture of the Tacoma Building thus, "The first complete steel skeleton (iron) building ever erected."

The destruction of the Tacoma Building showed that the north lot line wall and east alley walls were of solid brick. The court walls as well were of self-supporting masonry. There were in addition two solid masonry transverse dividing walls that ran from the basement to the roof. These divided the building into three sections. A 20-inch girder extended diagonally between these transverse bearing walls resting on an unusual arrangement of cast-iron lintels and door jambs which framed the corridor openings and supported the girder. There were five interior columns on each floor—two in the east section, three in the center and none in the north. The lot line walls, court walls, alley ways and interior bearing walls thus absorbed roughly 75 per cent of the floor load so there is only a small proportion exclusively supported by the iron construction.

The Home Insurance Building was designed in the early part of 1884. The building permit was issued in March 1884. Ground was broken May 1, 1884, and the first tenants moved in in the fall of 1885.

CONSTRUCTION OF THE HOME INSURANCE BUILDING

The Home Insurance Building, as it was built in 1884-5, consisted of ten stories. To these, two additional stories were added in 1890-91. With this exception the building remained substantially without change and without defects appearing in its construction down to its date of demolition, October 1, 1931. The two stories added in 1890-91 will be ignored except to say that they were of skeleton steel construction which though different in design from the underlying construction was joined to it and continued it without rearrangement of column centers or framing.

The original building therefore, as constructed, was in the main a rectangle, 138 feet on LaSalle Street, and 98 feet on Adams Street with an ell on the northeast corner 60 feet by 26 feet. On the east side at about the center, the rectangle was indented with a light court, 49 feet north and south by 33 feet east and west. The superstructure was supported by foundations consisting of isolated footings of the spread variety of dimension stone under each pier center on the street fronts, under each column center on the courts and under each interior column, and continuous spread footings under the party walls. The first two stories on the street fronts were of solid rock faced granite backed with tile. These walls were battered from 4 feet at the bottom to 2 feet and 10 inches at the top. Above the granite on the street front the façades of the building were of red pressed brick unvitrified with continuous stone sill and lintel courses confining spandrels of brick or terra cotta. At the fifth, eighth and tenth floors heavy stone belt courses of cornice type extended the full length of the street fronts. At occasional places such as the corners of the façade and apparently for the sole purpose of architectural design brick pilasters, seven in all, 8 inches thick projected beyond the typical face of the piers. Of the typical piers there were twelve on the street fronts and six on the court and one on the alley. Each bay, of which there were in all eighteen on the street fronts, contained a pair of windows separated by a heavy ornamental cast-iron mullion.

The party walls on the north and on the east sides and on the west side of the ell were of solid masonry, composed of common brick and continuing from the foundations to the roof. On the two street fronts beginning at the level of the third-story window sills and on the north, south and west walls of the light court and on the alley (north) elevation of the ell above the top of the foundations cast-iron columns were superimposed, one for each pier and each, one story in height. Within the circumference of the walls all floor loads throughout were carried on superimposed cast-iron columns of which there are thirty-nine on each floor, extending from the foundations to the roof. There were no masonry interior walls except a small vault inclosure against the north party wall.

The exterior and light court columns and their connections may be described briefly as follows: There was a hollow cast-iron column 10 inches by 14 inches in the fifth story; 8 inches by 12 inches in the ninth. This column supported on either side on cast-iron integral brackets heavy cast-iron lintels the full thickness of the wall, and extending from column to column. Three-

quarters of an inch above the lintels at the third, fifth, eighth and tenth floors extending from column to column were two or more wrought-iron I-beams typically twelve inches in height supported on cast seats and heavy cast-iron separators integral with the columns. These beams were further secured to the columns by 1-inch diameter wrought-iron clamps 9¾ inches long, screwed into the column and turned down and let into the flanges of the beams. The function of these beams was dual: as bracing and ties for the columns, and as support for the masonry spandrels and cast-iron mullions. As the columns are in sections each a story in height, they were flanged at top and bottom and fastened to each other on a sheet lead bearing with 1-inch bolts through the flanges. Extending from each exterior column to the nearest and opposite interior column were two 12-inch wrought-iron girders supported on cast brackets and also secured as described by wrought-iron clamps. The columns and connections for the light courts and the alley front of the ell are so similar that they need not be described. The interior columns were around 9 inches in diameter on the ninth story and increasing on the lower stories. They had square top and bottom flanges and were bolted together through their flanges with ¾-inch bolts. They and the exterior columns as well seem to have been filled with cement mortar which it was believed would render them more fireproof. The girders connecting the interior columns were composed typically of two 12-inch wrought-iron beams supported on cast-iron brackets and separators and clamped as described.

Something more should be said about the peculiar construction of the cast-iron exterior lintels. These lintels were for typical situations, 2 feet wide and 4¾ inches thick. They were of a very heavy metal molded on exterior and interior edges and being troughlike in section were filled with concrete. Each lintel was jointed in the center over the cast-iron mullion and the ends bolted together. The under portions were exposed to the elements and the lintels were intended to be a part of the architectural design as well as an important element of construction. At a distance of 1 foot 9 inches from the center line of the columns the lintels were notched back on their exterior face 3⅜ inches to allow for the unobstructed construction of the brick pier facing normally 4 inches but in places 12 inches in thickness including wall and pilaster. Wherever the iron lintels occur there are midway in their span heavy ornamental cast-iron mullions extending from lintel to lintel and thus forming a continuous metal support from top to bottom of the building except that they were not very securely bolted. As not pertinent to the purpose of this investigation, no description will be made here of the secondary framing or construction or of the fireproof floors or partitions except to say that the floor beams were typically of 8-inch wrought-iron beams, 5 feet centers, supporting flat tile arches.

There can be no possible question that the metal frame described above assuming the presence of the party walls and the lower two stories of granite on the street fronts (which can be regarded as superterrene foundation) was a perfectly rigid and stable metal cage. In other words, it did not depend in any degree for its stability on any masonry or other construction. Under our definition of skeleton construction, however, it would be necessary to prove that this rigid metal cage supported all the loads of floor and wall. Here again, there can be no question of floor loads for which there is no support other than the columns (except for floor contiguous to party walls) and there is no question of the spandrels which are directly supported by cast-iron lintels and the spandrel girders, which, in turn, are supported by the cast-iron columns.

In the important matter of the masonry piers, the conclusion is not so obvious. In the *Inland Architect* for November, 1891, Major Jenney says of the Home Insurance Building, "it was necessary to make the piers narrow for light and light (in weight) on account of the foundations (nature of the soil); a column in each pier furnished the natural solution." In other words, Major Jenney courageously concluded that by taking the floor loads on his exterior columns he could reduce his piers to a minimum in width and weight. This is virtually what he did in the Leiter Building, corner of Franklin and Adams Streets, Chicago, Illinois, built in 1879; except in that case the exterior columns are independent of the walls which are clearly self-supporting and the framing is of wood. He must, however, have known in the case of the Home Insurance Building that his piers would be dependent for their stability if not for their support on the columns that they completely encased. Brick piers of their tenuity ten stories in height could not have stood without the contiguous presence of the iron columns. It therefore comes down to a question of what if any support is furnished by the exterior columns to the exterior piers.

N. D. Morgan, in the *Western Architect* of March 1926, says of the Home Insurance Building, "this building was a ten-story structure in which the floor loads were carried by Bessemer and wrought-iron beams attached directly to cast-iron columns embedded in self-supporting brick walls."

Montgomery Schuyler in the September, 1907, number of *Scribner's Magazine* describes "cage" construction as a metal frame that carries all of the loads except the walls (piers?) which carry themselves. He then says that the Home Insurance Building is of the "cage" type, in other words that its piers are self-supporting.

The opportunity of determining whether or not the exterior masonry piers were completely supported by the inclosed iron columns and the contiguous iron frames was furnished during the wrecking of the building and our Committee took advantage of the opportunity to determine the matter. Accordingly, the two typical piers were stripped or girdled, one midway between the fourth and fifth floors and the other in the third story at the top of the window level. In each case the masonry was entirely removed for a space of two feet, completely exposing the column; the masonry piers above remaining undisturbed to the height of the remainder of the story on the fourth floor and a full story on the third floor. The stripping was left undisturbed and unshored until the building was wrecked down to that point, a matter of one day. No cracking of the piers or other failure of the masonry was apparent during the interval. This indicates to the Committee that regardless of Major Jenney's intention in the matter, and of the opinions of various commentators on the building, the piers were in fact supported by the structural skeleton. This is not surprising. In fact, it is inevitable when it is considered that the superficial horizontal area of the typical masonry pier was 800 square inches, of this 640 square inches was supported directly by the cast-iron lintels and the doubled 12-inch spandrel beams and the doubled 12-inch floor girders. The remaining 160 square inches, one-fifth of the area, represents in typical cases the pier facing 4 inches in thickness and 3 feet 6 inches in width. As this facing was bonded into the pier, it could not help but be supported by corbel action from the main body of the pier. There was in addition, though unessential to its support, considerable adhesion to the iron column to which the brickwork was closely pressed. Furthermore, at certain places stone lintels and stone belt cornices directly supported by the iron framing traversed the piers and was bonded into them forming a cantilever and a beam action which aided in the support of the brick facing in the function of a shelf. An important exception occurs to the typical column design in the three street front corner piers. In these columns, at each floor, an iron flange extends 4 inches from

the outside faces of the columns into the masonry pier which at this point is 12 inches in thickness. This obviously was intended to support at least part of the pier. It also illustrates the "cutting line" which encircled the entire building at each floor at the juncture of the columns. We are informed by William D. Mundie, a draftsman of the building, that this "cutting line" was intended by Major Jenney to take up vertical expansion and contraction in the iron columns, and to divide the building in "layer cake" fashion into its integral sections of one story each.

Conceding then that wherever the metal skeleton is present it did in fact support all loads, we have then to weigh its importance and position in the evolution of the skyscraper. We believe that the claim of Leroy S. Buffington as the inventor and the father of the skyscraper should be dismissed for the reasons that he never erected a building embodying his patent (issued after the erection of the Home Insurance Building), that his infringement suits were decided in court against him, that he himself stated that his idea of an iron skeleton was suggested by the writings of Viollet-le-Duc, in which case Viollet-le-Duc would have as good or better claim than Buffington.

The other claim for first honors is that of the Tacoma Building. The claim usually takes the form of the first "complete" skeleton skyscraper or the first skyscraper in which the metal skeleton was "completely" developed. This building was built three years after the Home Insurance. The Tacoma Building introduced many important improvements over the construction of the Home Insurance Building and that it marked an advance in the science of skyscraper design there can be no doubt. The most important of these improvements was a continuation of the skeleton on the street fronts from grade to roof line. The next of importance was a direct support of the masonry piers by cast-iron angle brackets, a feature as stated, lacking in the Home Insurance Building except in the corner columns on the street fronts. The use of terra cotta for lintels and the like in order to tighten the load was a further improvement. In the aesthetic appreciation of the problem, the expression of its construction by its architecture was far ahead of its time, in which aspect it is a question if it has ever been excelled even to this day. Nevertheless the Tacoma Building still made use of cast-iron columns and all shapes other than the beams and girders which were of wrought iron.* It also had solid masonry lot line walls, cart and alley walls which could have been made skeleton construction and in our opinion showed a retrograde step in the introduction of the transverse masonry walls which assumed a very large proportion of the floor loads; whereas the interior of the Home Insurance Building was entirely free from self-supporting masonry. The use of solid masonry party walls were obligatory under the Chicago Building Laws in 1885 and 1887 so it is manifestly unjust to condemn their presence in the Home Insurance Building. The Tacoma Building, however, was not so bound when it elected to use lot line instead of party walls. Probably the first all-skeleton skyscraper in Chicago was not built until 1889, when in the Manhattan Building (Jenney and Mundie, architects) all the inclosing walls were made of skeleton construction.

CONCLUSION

As in the case of every great invention skeleton construction in its completeness was not nor could it have been discovered by any one man nor expressed in any one building. The early buildings for this reason are all more or less transitional and experimental. Each learned from the experience of the preceding and added its contribution in the development of the idea. It is, however, entirely possible, from a consideration of the evidence, to appraise the relative importance of each in terms of its originality and its influence on the work which followed. Acting on this conviction we have no hesitation in stating that the Home Insurance Building was the first high building to utilize as the *basic* principle of its design the method known as skeleton construction, and that there is convincing evidence that Major Jenney in solving the particular problems of light and loads appearing in this building discovered the true application of skeleton construction to the building of high structures and invented and here utilized for the first time its special forms.

We are also of the opinion that owing to its priority and its immediate success and renown the Home Insurance Building was in fact the primal influence in the acceptance of skeleton construction: the true father of the skyscraper.

Submitted by the Committee, November 24, 1931.
THOMAS E. TALLMADGE, *Chairman.*

NEITHER A SKYSCRAPER NOR OF SKELETON CONSTRUCTION — IRVING K. POND

NO 8-story structure—which the Home Insurance Building, designed by Major W. L. B. Jenney in 1884, really was as involving metal supports in outer walls—can by any stretching of the term be called a skyscraper. For centuries, probably, 8- and 10-story buildings were commonplace the world over and attracted no attention by their height. When one realizes that the 21-story Masonic Temple (Capitol Building), the first of Chicago skyscrapers, or the completed 12-story Home Insurance Building, doubled in height, would rattle inside the dome of St. Peter's in Rome, one can understand how minor an affair a mere 8- or 10-story building would be to the traveled or knowing.

In the masonry-walled water tower designed by S. S. Beman for the town of Pullman, and which might well fall in the category of skyscraper, Phoenix rolled shapes were used in braced columns some two hundred feet in height; these and the walls supporting an iron tank 40 feet in depth and of the same diameter! This tower antedated by about two years the Pullman Building in Chicago, on which construction was begun in the spring of 1883 and which is 10 stories in part. As I had charge of the structural design of both edifices, I am fairly conversant with the matter.

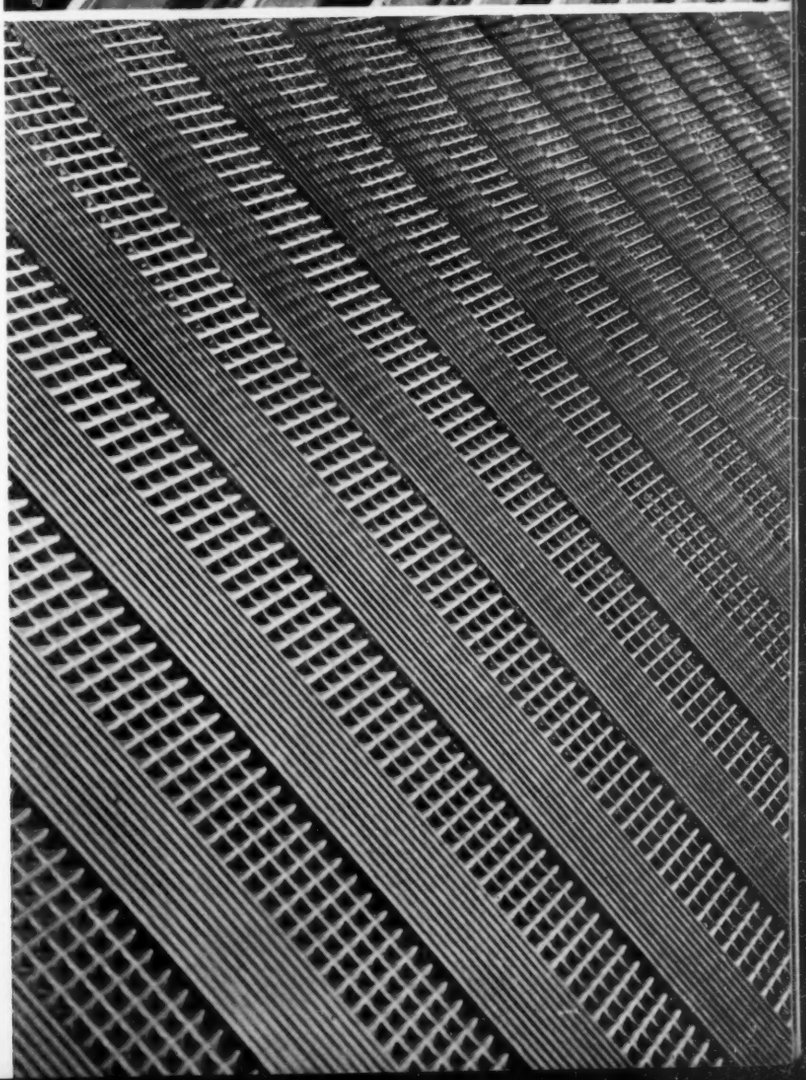
Now as to the "skeleton frame" of the Home Insurance Building: All vertical supports, in walls or otherwise, were, as in the Pullman Building, of cast iron with beams and girders of rolled iron. The wall verticals, which occurred in the Home Insurance Building only, and there in but eight stories, from the third to the tenth inclusive, were bolted at the joints. These verticals rested upon a plinth consisting of two stories of massive granite masonry which are ignored in this discussion as having "nothing to do with the case" except to confine the metal of the street fronts to eight stories. Up to and including the third floor system floor beams and girders were wall-bearing on the two street fronts as were the beams and girders of all floor and roof systems on the massive alley and dividing line walls; and floor systems could not be installed until walls were up and ready to receive them. At

(*Concluded on page 32, advertising section*)

*Letter of Holabird and Root cited above. The superintendent of the wrecking contractor states that above the third floor all beams and girders were of steel; below, of wrought iron.

FIELD BUILDING
CHICAGO

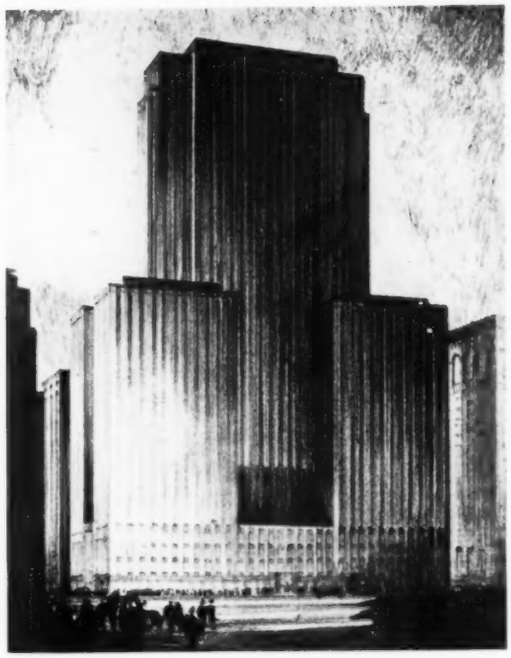
GRAHAM, ANDERSON
PROBST AND WHITE
ARCHITECTS



THE FIELD BUILDING

CHICAGO'S NEWEST SKYSCRAPER

GRAHAM, ANDERSON, PROBST AND WHITE
ARCHITECTS



PROJECT RENDERING

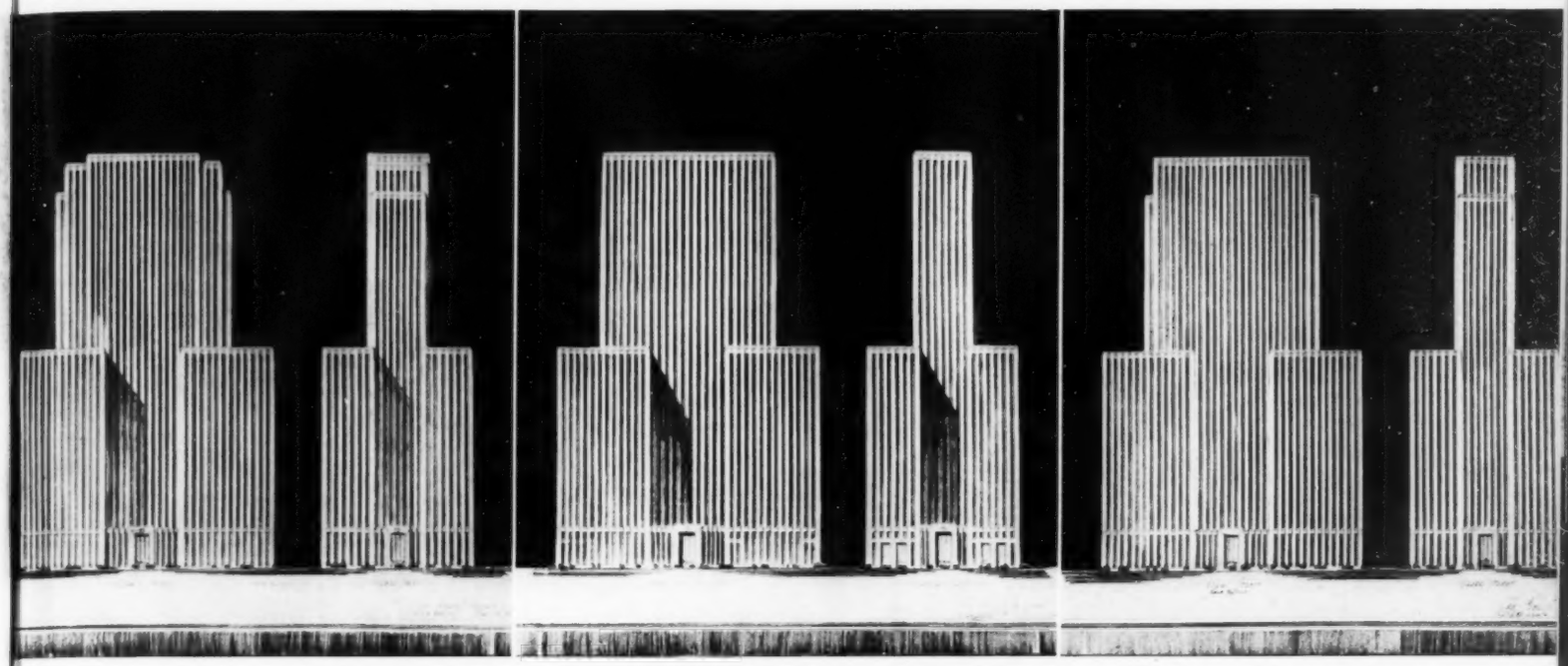
One million square feet of net rentable floor area became available with the opening, on April 28, of Chicago's newest and largest office building—the fourth highest office building in the world. It rises 535 feet above the street level, has 43 stories in its tower section and occupies a site that required the demolition of six structures, including the old Home Insurance Building. The building stands in the financial district of Chicago and occupies a full half block bounded by La Salle, Adams and Clark Streets.

Preliminary sketches for the Field Building were started in June, 1928, and in the two following years some forty sets of sketch drawings and financial set-ups were prepared. Selected examples of these sketches are illustrated with this article. Final sketches were approved in November, 1930. Working drawings were issued on June 8, 1931.

The Field Building was erected in three stages or units and the tower, each separately completed for occupancy. The building base is faced with a polished black granite while the facing of the superstructure is Indiana limestone. Window spandrels screening the floor edge are of cast aluminum. A white bronze trim was utilized for the window and door frames at the ground floor. Window frames for offices throughout are of aluminum, an innovation that contributes to ease of operation and improved lighting. Aluminum frames, because of their moderate sash width, permit a glass area 10 per cent greater than obtainable with wood frames. By precision in their manufacture there is virtually no rattle or air and dust leakage.

Physical training facilities, including courts for squash, racquets, and handball, are provided for tenants of the building. There are also exercise rooms, vapor and steam baths. These accommodations are available on the ground floor and are conveniently reached from the main arcade that extends through the block from La Salle to Clark Street. This main floor arcade is two stories in height and 305 feet in length. It gives quick access to the four elevator towers. The arcade is served by shops designed primarily for the convenience of the building tenants.

Elevator service provides speed up to 1,000 feet per minute. Each cab has a combination car-stop and position indicator to give the pas-



PRELIMINARY SKETCHES MADE ON APRIL 16, APRIL 18 AND MAY 5, 1930, RESPECTIVELY

sengers visual indication of the position of the elevator. The car-stop indication is a new device in elevator engineering. In connection with elevator signal lighting a radio device is installed to detect burned-out bulbs in hall signal lanterns. Ordinarily there is no way to discover this defect other than by chance observation. A burned-out bulb is indicated by radio equipment located in the penthouse where, by turning the dials, the elevator maintenance men can test the bulbs and arrange for replacements.

An automatic reversing arrangement reduces the unnecessary car travel during the rush hours. With this system a cab rising to the top of a shaft is automatically reversed in direction at the highest signal light in the shaft. The same system can be applied on the local and express cabs for holiday or daily after-hour service.

A lengthy study was made of the ventilation of the elevator cabs. After research it was decided to install a blower with a capacity of 4,000 cubic feet of air a minute in order to force air into a compartment at the top of each cab and thence through specially designed openings into the cab. As a result of this design there is positive ventilation that is quite independent of the elevator movement or its position in the elevator shaft.

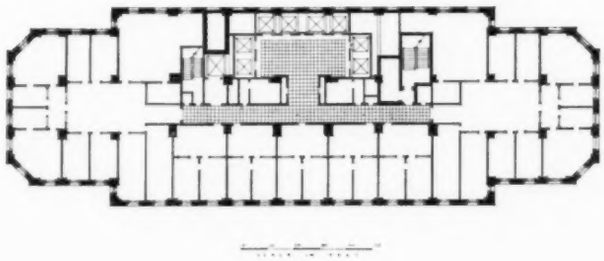
Heat is supplied by a two-pipe vacuum heating system with individual riser control. Four different types of heating are, in fact, possible. First, for cold weather there are two 500-horse power Babcock & Wilcox coal-burning boilers, fired with chain grate stokers of the same make. Second, for mild weather, there are two 250-horse power B. & W. oil-burning boilers, with Bethlehem oil burners. Third, these oil-burning boilers can be converted for gas without important changes. Fourth, for stand-by service and for heating water during the non-heating season, there is central station steam. With this flexibility in selecting fuel, it is anticipated that heating costs can be kept to a minimum.

Because of the great height of the building and the excessive pressure required, it was decided to split the domestic water supply system into two independent zones—one for the tower and another for the main lower part of the building. Each system has its own storage tanks, pumps and equipment and is independently complete.

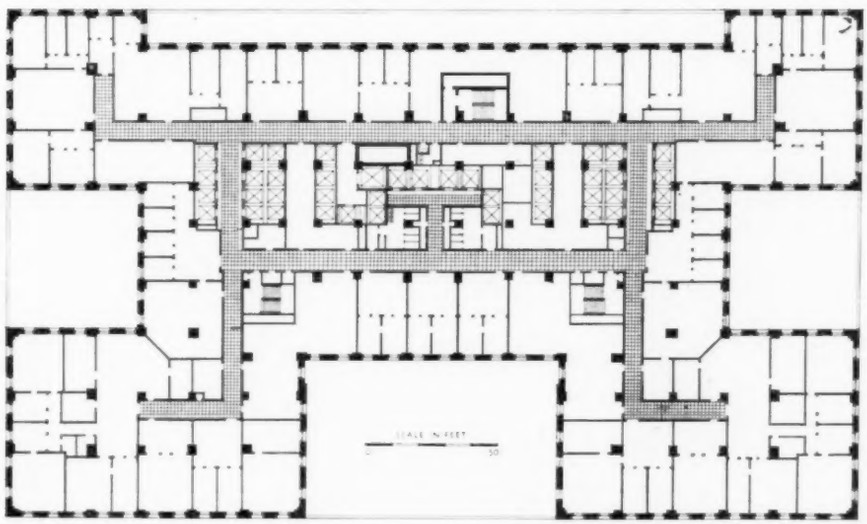
Hedrich-Blessing Photographs

THE FOURTH LARGEST OFFICE BUILDING IN THE COUNTRY

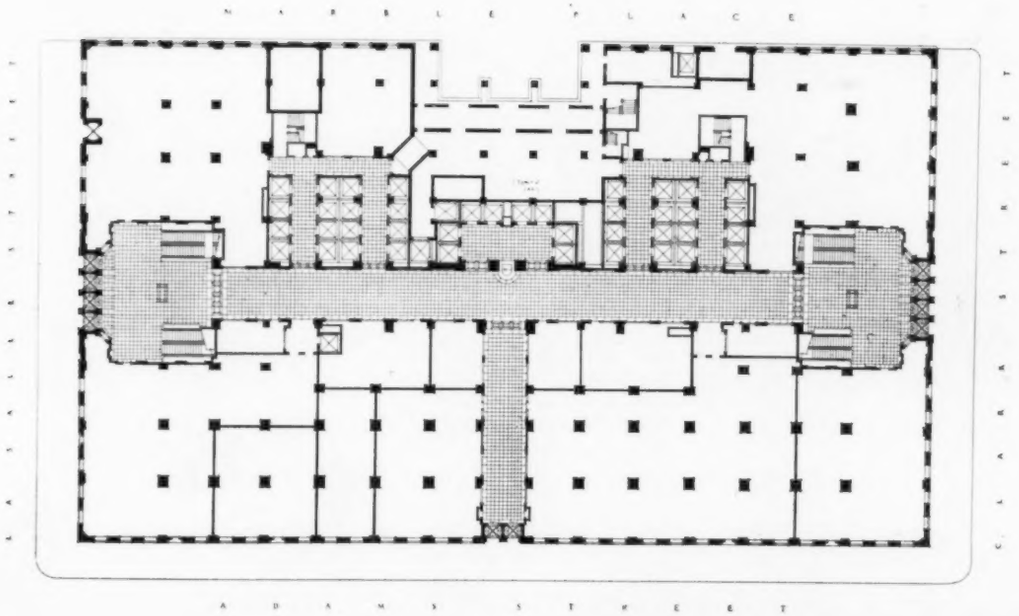
TOWER FLOOR

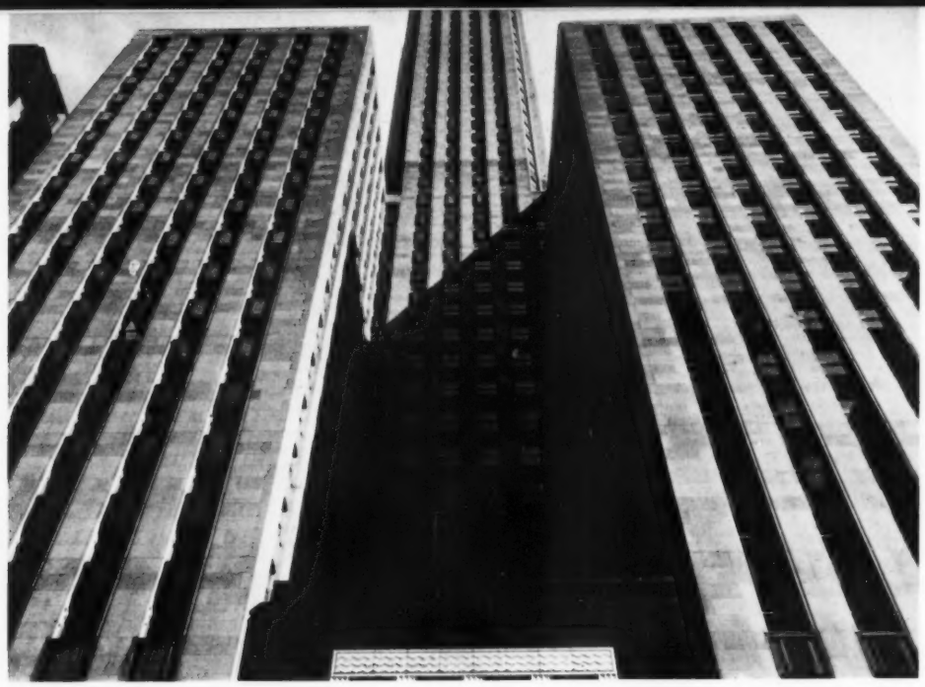


TYPICAL FLOOR



GROUND FLOOR





Hedrich-Blessing Photographs

Chicago Architectural Photographing Co.

DETAIL VIEWS OF CHICAGO'S LARGEST OFFICE BUILDING

GRAHAM, ANDERSON, PROBST AND WHITE ARCHITECTS

Chicago Architectural Photographing Co.

1,000,000 SQUARE FEET OF NET RENTABLE AREA

Hedrich-Blessing Studio

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS

GRAHAM, ANDERSON, PROBST AND WHITE, ARCHITECTS

Chicago Architectural Photographing Co.

The safe deposit vaults for the building are available not only to tenants, but also to firms and individuals in the neighboring buildings.

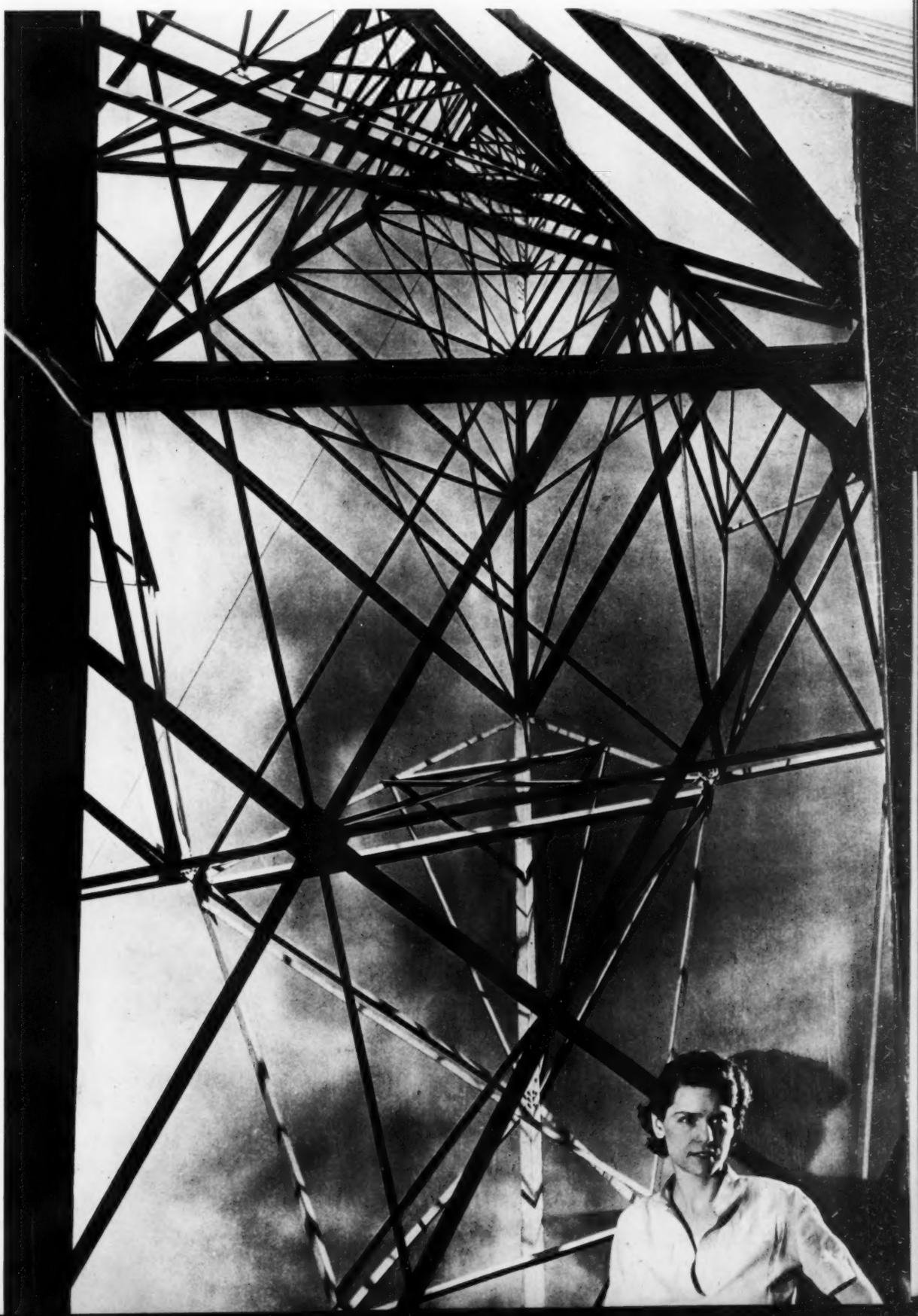
Hedrich-Blessing Studio

PHOTOMURALS IN NBC STUDIOS

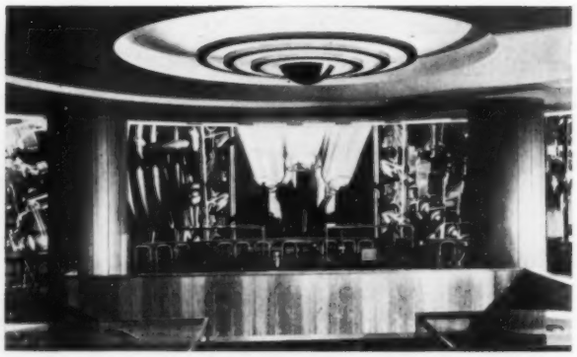
R. C. A. BUILDING, RADIO CITY, NEW YORK

PHOTOGRAPHS BY MARGARET BOURKE-WHITE

This view shows Miss Bourke-White in front of an antenna tower panel.



SOUTH WALL



NORTH WALL

INFORMATION ABOUT BOURKE WHITE PHOTOMURALS NBC STUDIOS, R. C. A. BUILDING, NEW YORK CITY

The mural was composed entirely of industrial subjects which would tell the story of the mechanics of radio. It was hung in the large circular reception room of the National Broadcasting Company's studios at Radio City. Access to this rotunda from the main lobby is by means of a wide staircase which, with four large supporting columns, forms the axis of the room.

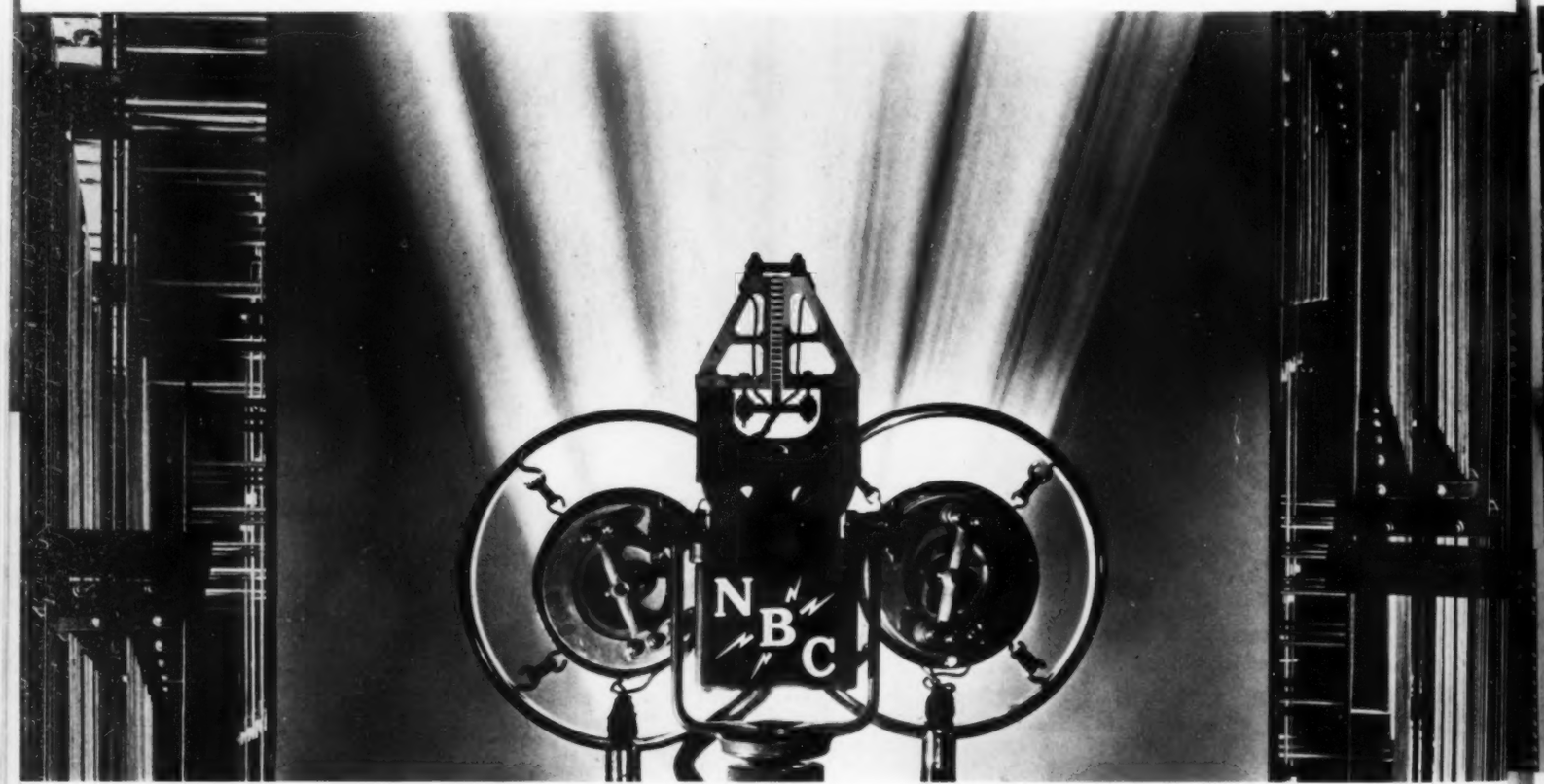
The walls were acoustically treated, and the murals were mounted on felt to preserve the acoustic quality.

The negatives were enlarged directly on canvas coated with photographic emulsion, instead of the usual photographic paper which is approximately half the cost. Neither material exceeds the price range of the better wall papers. Either can be coated with transparent lacquer, which makes cleaning possible, and neither will fade.

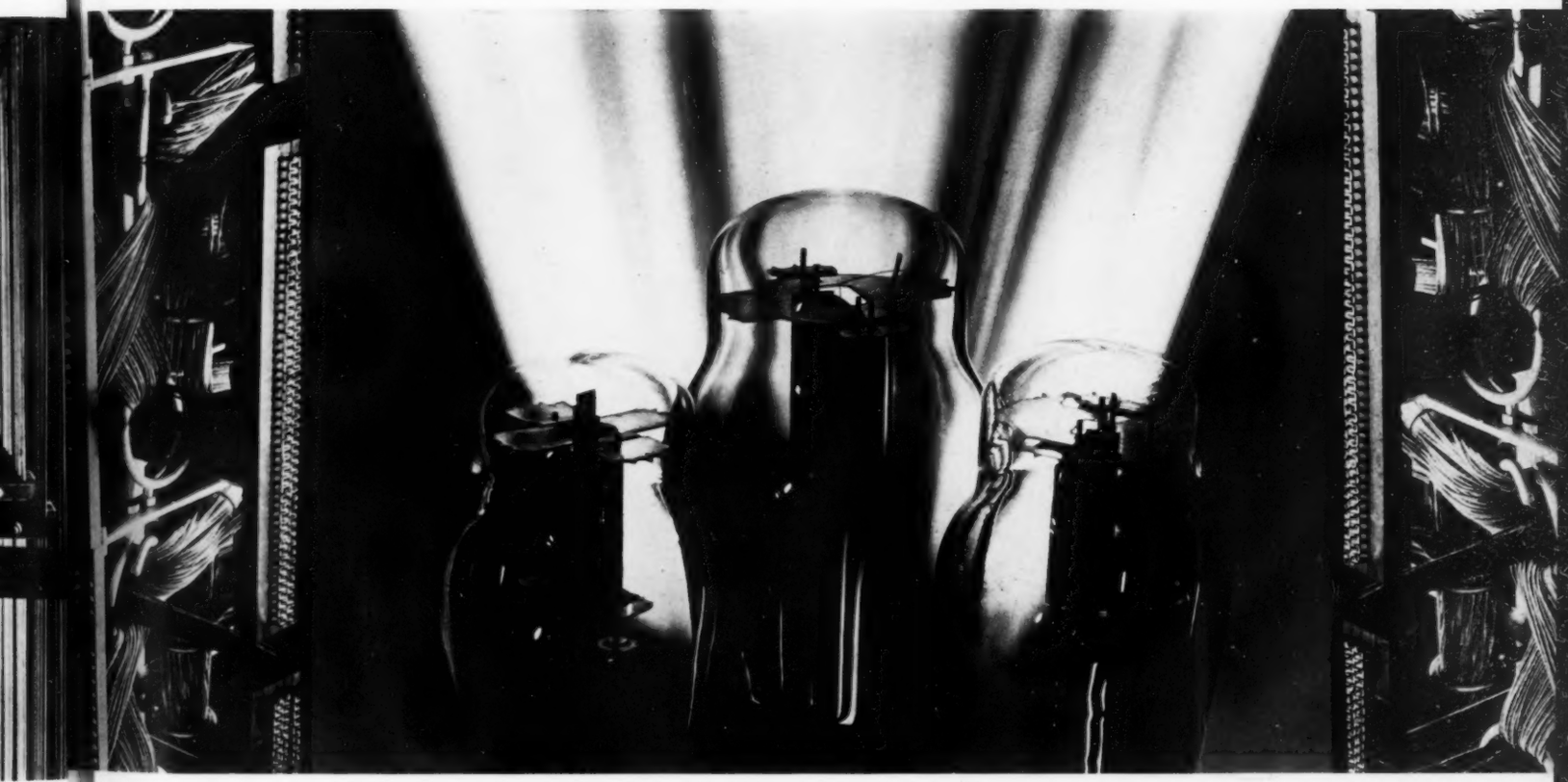
The enlarging was done in strips of 40-inch width, the central panel comprising four strips, and the other panels two or three, which required careful matching. Perfect definition in the photographs was important because the usual "printing in" and dodging devices common to photographic enlarging are not possible with mural enlarging since matching is made difficult or impossible.

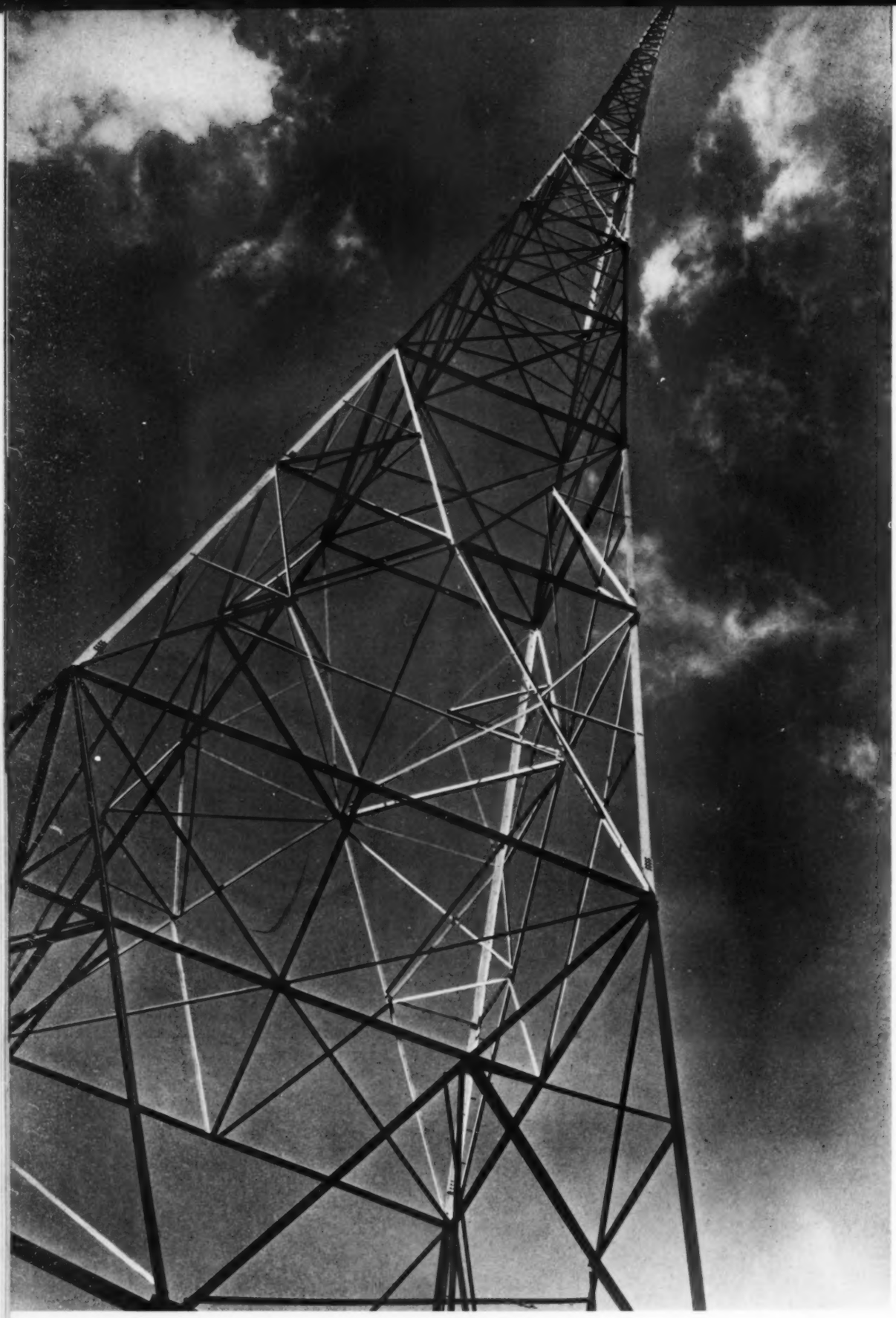
Eastman panchromatic film was used, the negatives being 5" x 7" or 8" x 10". The negatives were developed in fine grain borax developer. In composing the photomurals several hundred negatives were made. Each subject was photographed from many points of view and under different types of lighting. This was done to give a wide selection so that in the final design as close harmony as possible could be achieved. The mural was composed to harmonize with the architectural features of the room.

CENTRAL PANEL ON SOUTH WALL: MICROPHONES SYMBOLIZE OUTGOING SOUND. ON EACH SIDE ARE BUS-BARS. PHOTOGRAPHS BY MARGARET BOURKE-WHITE

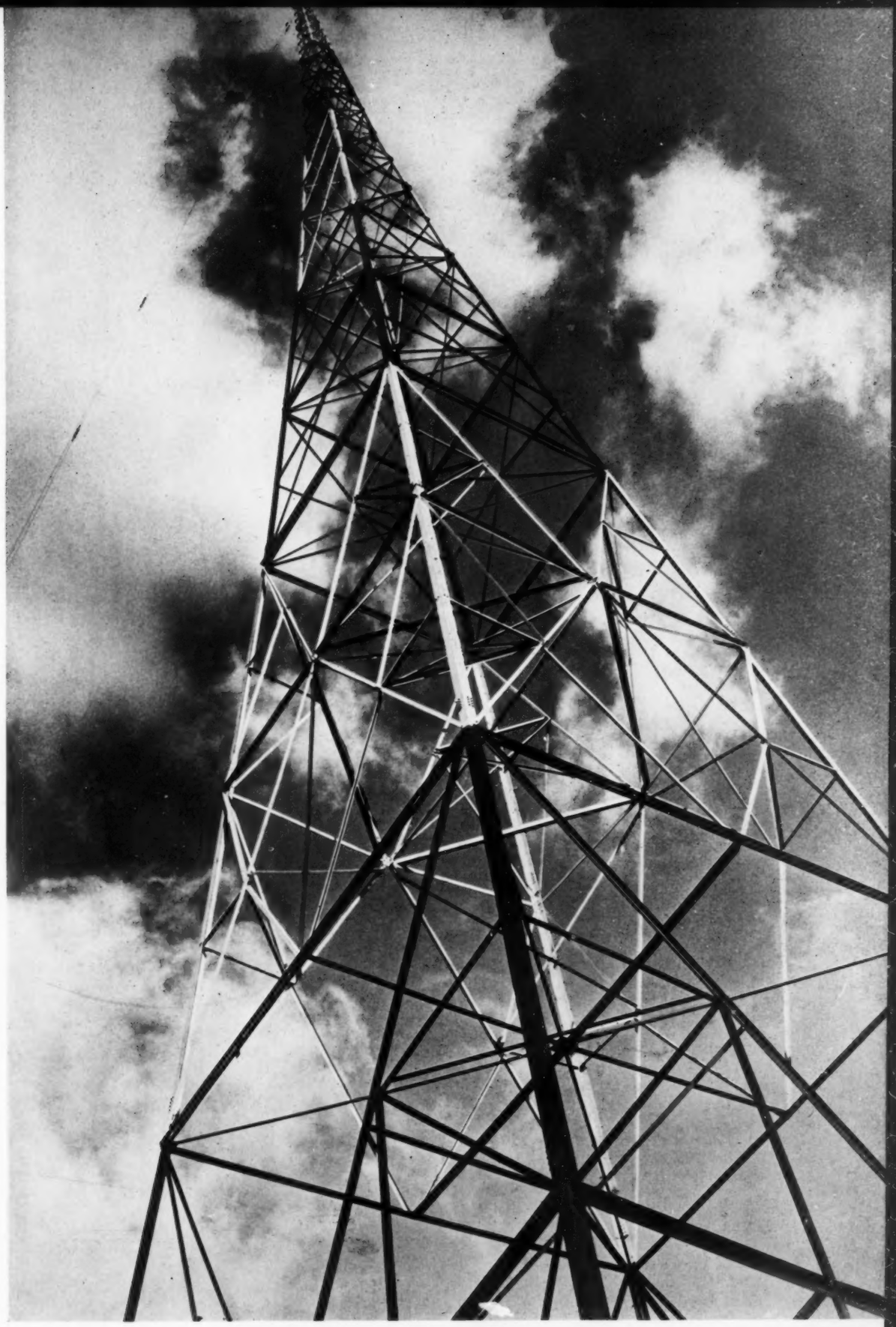


CENTRAL PANEL ON NORTH WALL: RECEIVING TUBES SIMILAR TO THOSE IN HOME RADIO SETS SYMBOLIZE INCOMING SOUND. PANEL BOARDS AT SIDES

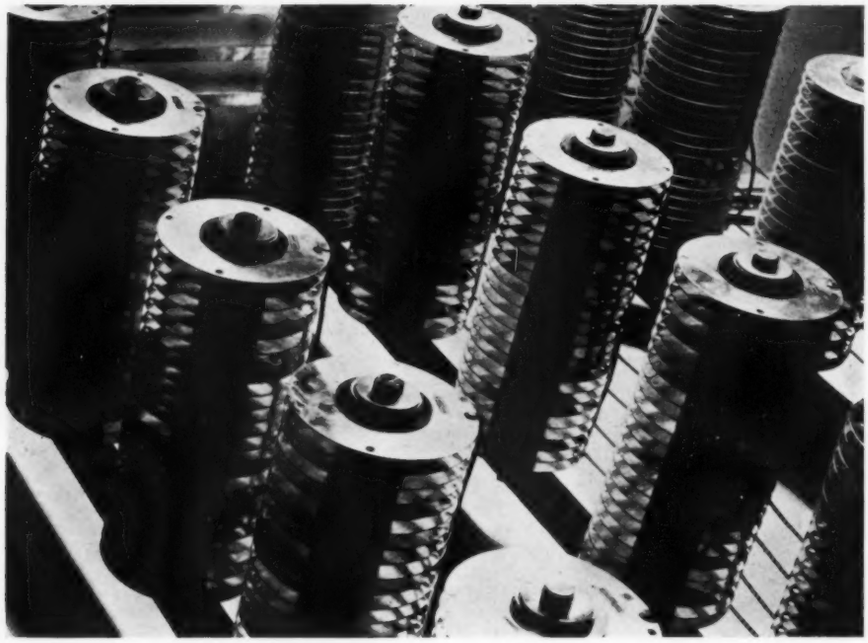




ANTENNAE TOWERS AT BELLMORE, LONG ISLAND

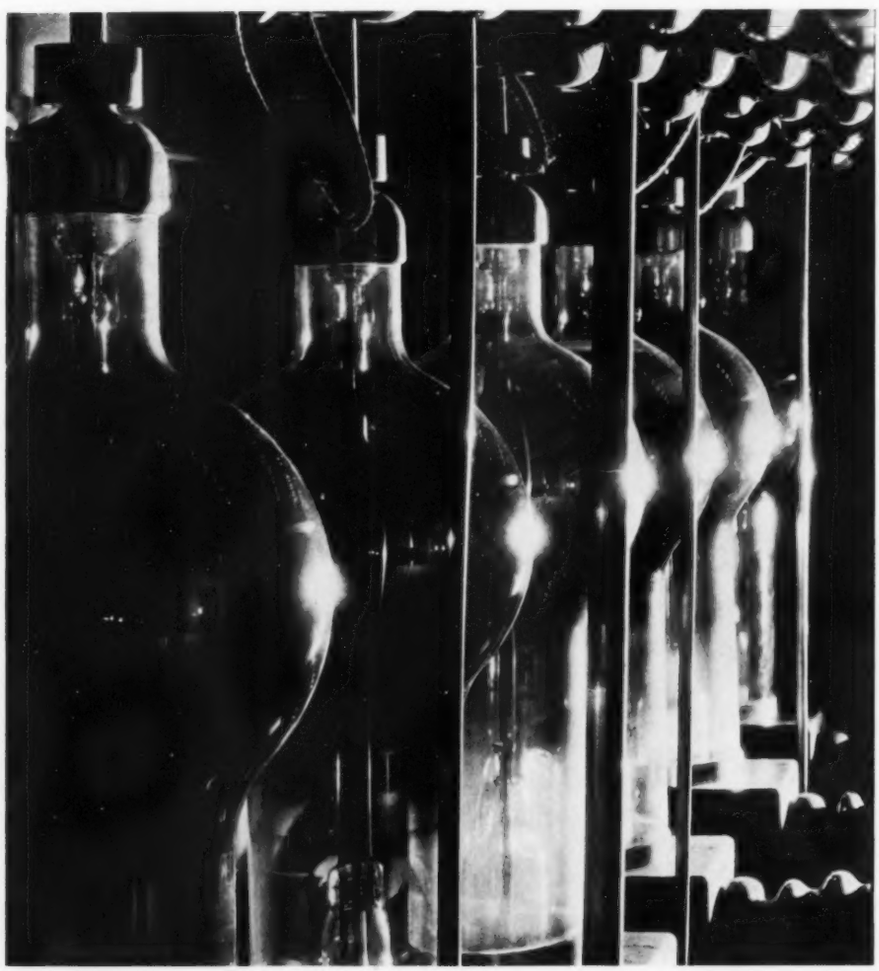


PHOTOGRAPHS BY MARGARET BOURKE-WHITE



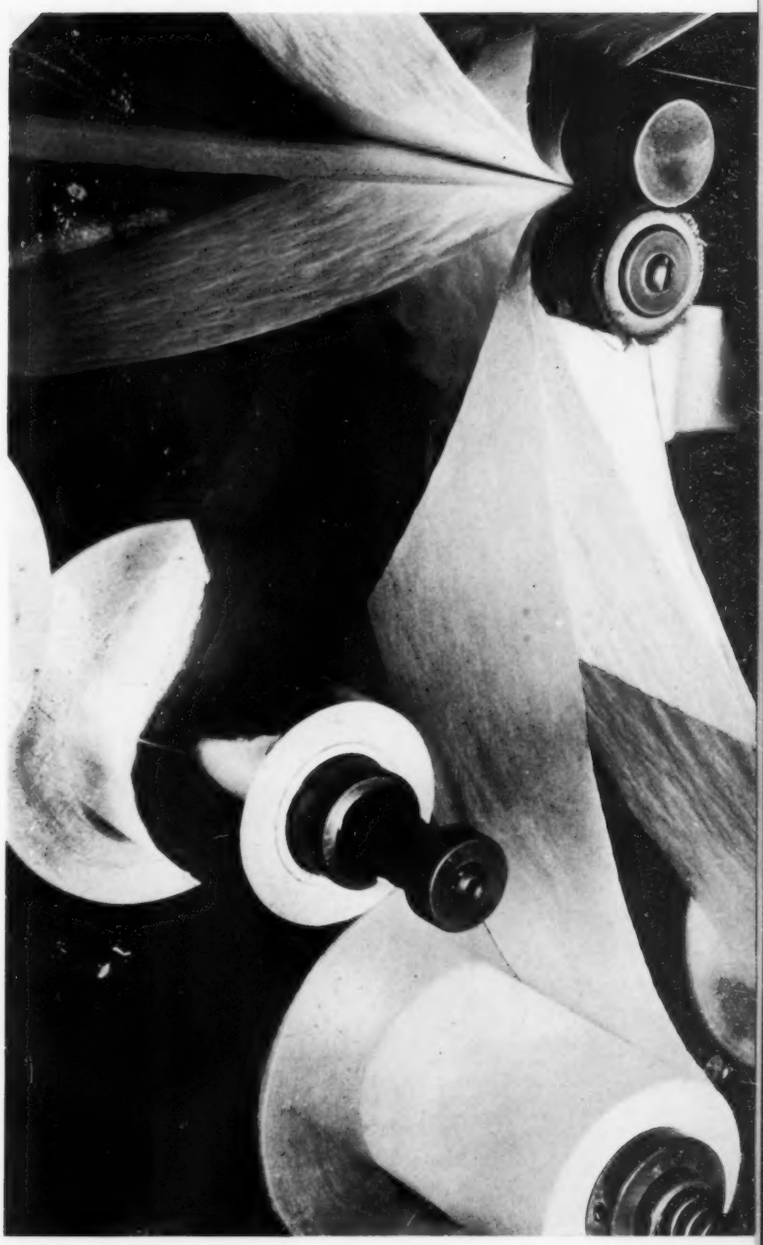
RECTIFIERS FOR RECTIFYING CURRENT FOR METERS

10-KILOWATT POWER TRANSMISSION TUBES

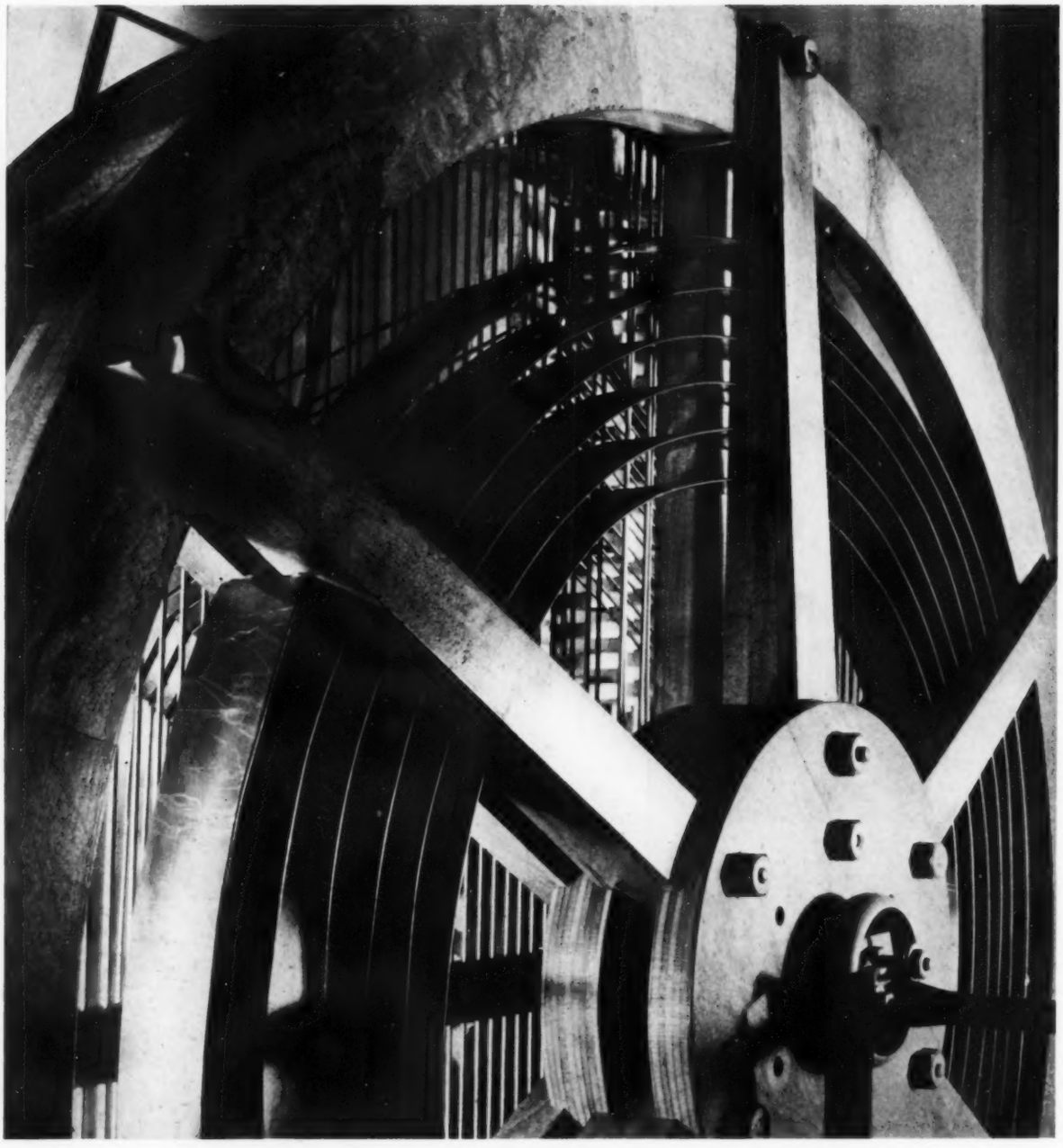


LOUD-SPEAKERS IN FACTORY
AT CAMDEN, NEW JERSEY

WINDING CONDENSER COILS



PHOTOGRAPHS BY
MARGARET BOURKE-WHITE



TRANSMISSION STATION HELIX — PHOTOGRAPH BY MARGARET BOURKE-WHITE

THE ARCHITECTURAL RECORD, AUGUST 1934

TECHNICAL NEWS AND RESEARCH

REDUCING CONSTRUCTION COSTS—Part 2

BY
HAROLD R. SLEEPER

WHEN BIDS AND BUDGET DO NOT BALANCE

HOW TO REDUCE CONSTRUCTION COSTS

By
HAROLD R. SLEEPER, Architect
Office of Frederick L. Ackerman

Part one of this study appeared in December, 1933. The purpose of the study, which was undertaken at the suggestion of this magazine, was indicated in the opening paragraph: "The architect today is faced more than ever with the fact that incoming bids may exceed the owner's budget. Costs may have dropped 15 or 20 per cent below normal, but the owner's expectancy has dropped as much as 50 per cent." Part One dealt mainly with the following topics: temporary office, photographs, telephone service, temporary heat, cleaning, samples and models, grading, footings and foundations, floor slabs, concrete specifications and forms, basement. The study is of practical value to architects who have work in prospect and Part Two is published now in the belief that the modernization movement promoted by the National Housing Act may induce quite a few owners to restudy projects whether or not these come under the provisions of the Act. Harold R. Sleeper is co-author, with Charles George Ramsey, of "Architectural Graphic Standards," published by John Wiley & Sons, Inc., 1932.—The Editors.

PART TWO

MISCELLANEOUS MASONRY

Brick:

Change bonds of brickwork from Flemish or English to common bond.

Change brick joints from rodded or tooled to struck or weathered type.

Allow brick to be laid from inside of wall with joints struck while wall is going up.

Solid exterior brick walls may be changed to brick veneer on wood studs.

Brick veneered walls may be changed to stucco.

Omit ground brick arches and use mortar joint instead.

Partitions:

Interior bearing partitions may be made of double brick instead of common brick with economy if double brick is available near the job; or these partitions may be made of concrete blocks.

If the loads are slight, consider the use of heavy clay hollow tile blocks for these bearing partitions.

Granite facing may be replaced by machine-made terra cotta blocks with edges ground to level.

Mortar:

Satisfactory exterior mortar may be secured at a saving by use of 1 part cement, 1 part hydrated lime and 6 parts sand.

MASONRY

All types of material for fireplaces.

Facings and Outer-hearths:

Materials specified.	*Suggested substitutes.*
Marble	Phenolic compounds in sheets.
	Asbestos imitation marble.
	Slate imitation of marble.
	Cast plaster marble imitation.
	Plaster painted to imitate marble.
	Zenitherm.
Limestone, sandstone, Travertine	Cast cement.
	Cast plaster.
	Zenitherm.
	Domestic travertine.

Materials specified.	*Suggested substitutes.*
Face brick	Common brick.
Brickettes	Second-hand brick.
	Omit patterns in laying, such as herringbone.
(With lower costs than any of the above types but changing the character of the facing.)	Soapstone.
	Terrazzo hearths.
	Slate, structural.
	Tile.
	Fieldstones.
	Local stone as available.
	Plaster painted.
	Stucco.
	Structural glass.
Faience tile	Quarry tile or other cheaper tile.

Linings and Inner Hearths:

Materials specified.	*Suggested substitutes.*
Face brick	Fire brick painted.
Brickettes	Black brick (fire-resisting).
Tile	Common well-burned brick.
	Soapstone (fire-resisting kind).
	Quarry tile.

Other items that may be omitted on fireplaces are:

1. Ash dumps.
2. Gas lighters.
3. Dampers on very large openings. Use steel angles and the like. Use poker type dampers when others have been specified.

Build all masonry complete in the first rough operation and not in two separate operations.

GRANITE

Consider use of granite veneers (2″ to 4″ thick) facing instead of granite walls.

The cheapest finish for this material is bush-hammered or pointed finish (except the sawed or sandblasted finishes). Certain types of lettering and carving can be executed by sandblasting and this is much more economical than hand cutting.

Cut cast stone may be more economical.

Terra cotta machine-made ashlar is an economical substitute.

EXTERIOR MARBLES

Certain domestic marbles may be found that are satisfactory for use in place of the more expensive imported marbles. New domestic marbles are constantly being put on the market.

Other substitutes are cut-cast cement, cast cement with colored finish, limestone and sandstone.

LIMESTONE

Sawed strip limestone may be used for ashlar facings at considerable saving over the usual cut limestone work.

Limestone costs are reduced if one tone of stone is not required and the variegated type used.

Economical finishes are sand or shot sawed or smooth planed.

If ¼″ joint is acceptable it will be an economy over the usual 3/16″ joint.

When stone is used in conjunction with brickwork an economical mortar is 1 part lime, 1 part cement, 6 parts sand.

Zenitherm is used as a substitute for limestone. Cast plasters for interior work are used.

Cast cement may be used in place of limestone for chimney caps, door sills, window sills.

IRON AND STEEL

Miscellaneous Items:

Omit area gratings (if protection is needed, use railing).

Omit steel disappearing stair to attic. Use trap door instead.

Stock spiral stairs may be used in place of the usual stairs for cramped spaces and are very good for alteration work.

Use ship ladders instead of stairs for access to spaces, such as machine rooms and elevators.

Omit leader shoes and use clay tile connections.

Simplify all wrought-iron stair rails, balusters, handrails and change to wood where possible.

Omit or simplify all cast or wrought-iron grilles, gates, brackets, and the like.

Change steel stairs to concrete if labor costs are low. See grilles under sheet metal.

Metal Bucks:

Type of metal buck without trim for service spaces and utility rooms may prove economical.

Consider metal bucks in place of wood bucks, trim, grounds, etc. In some work this type of construction on account of low labor costs will be advantageous.

STEEL WINDOWS

Where heavy or intermediate weight sash have been specified use stock size lightweight sash. These are sufficiently heavy for small-size openings. Stock wood frames may be used instead of specially designed frames for steel windows. All wood frames may be omitted and steel frames held in masonry wall with fins. Use of friction hinges will save cost of stays and will operate satisfactorily.

Get estimates on use of wood windows as well as steel sash.

HOLLOW METAL DOORS

Design them so that they are in accord with the Simplified Practice Recommendation R-82-28 as established by the U. S. Department of Commerce Bureau of Standards. This pamphlet specifies the gauge of metal thickness, dimensions of rails, stiles, rebates, bevels, and the like. Doors following these standards will be more economical than those specially detailed.

Check class of underwriters label specified to see that this is in accord with the minimum demanded. Do not ask for labels where not actually needed.

Omit graining on steel doors.

KALAMEIN DOORS

The U. S. Department of Commerce Bureau of Standards Simplified Practice Recommendation R-83-28 gives specifications for these doors, including stock sizes. The same suggestions as made for hollow metal doors refer also to kalamein doors.

In certain localities hollow metal doors may cost less, in quantity, than best grade kalamein doors.

STRUCTURAL STEEL

Consider use of bolts for field connections instead of rivets on jobs where steel tonnage is small. Also on such

work consider substitution of two small steel members in place of one larger girder as this decreases erection costs. Where steel framing for roofs has been specified substitute frame roof with (a) slow-burning construction or (b) ordinary wood framing. If remainder of building is of fireproof construction, this change will not alter fireproof insurance rating but will slightly increase the insurance premium. Such substitution is especially worthwhile in roofs involving dormers, hips, valleys, and the like.

ROOFING

Flat roofs of slate, tile or sheet metal may be changed to built-up roofing with heavy composition wearing surface where required or wood construction with canvas deck may be used at a still greater saving.

Where slate roofs of graded type have been specified change to 3/16" or 3/8" thickness and make all slate same length.

Where tile roofs are specified change to slate or where hand-textured flat shingle tile are specified change to machine-textured tile.

The comparative cost of asbestos shingle and slate should be determined by estimates.

Change lead-covered copper roofing and flashing to copper.

Where lead roofing and flashing is specified change to lead-coated copper.

Use stock gutters, stock gutter brackets, stock leaders in place of specially detailed work.

Change all built-in gutters to hanging gutters.

Window flashing at window heads may be of heavy tarred felt or of tarred fabric.

Consider Armco as well as copper and aluminum.

CARPENTRY

Rough Carpentry:

Check all lumber grades to see that requirements are not more severe than necessary. Structural lumber should be No. 1 Common but roofers, sheathing, subflooring, furring, etc., may be No. 2 and when some of the Western woods are used even No. 3 may be used. Collar beams, ties, bridging, partition studs on small work may be changed from No. 1 to No. 2 Common lumber.

Sleepers may be reduced from 2" x 4" to 2" x 3" and from No. 1 to No. 2 Common without any serious sacrifice. These may be run at right angles to the room walls rather than diagonally so as to save a little labor. Spacing of sleepers may be increased from 12" to 16" for floors with light loads.

Douglas fir in most localities is more economical than spruce.

Omit yellow pine and substitute fir for framing.

Omit cross furring on ceilings when metal lath is used.

Use straight sided boards instead of T & G boards for subfloors over concrete slabs as they are cheaper and safer.

Omit rough flooring in unfinished attics and place a narrow runway only.

Use 7/8" x 2" shingle strips for all shingle roofs in place of roofers.

Finish Carpentry, Exterior and Interior:

Use short shingles 16" and 18" long. If thick butt shake effect is desired, use machine-made shake. Thick shingles may be simulated by doubling shingles on walls and lapping side joints.

Omit blinds on windows that are not easily seen.

Change sash from 1¾" thick to 1⅜".

Omit all built-in gutters as they are very expensive.

Omit any dormers possible.

Eliminate bay and oriole windows.

Grades of wood are often better than needed for the exact requirement. Where antique stained effects are desired consider use of "C" grade material. If not, "B" should be used. For painted work "D" grade can often be used, in all cases "B" is possible.

Check all trim details to see that no profiles or trim are just too large to be finished out of the stock size larger. A 4" stock board, when dressed will only produce a 3½" finished board. Architects have a habit of showing rails and stiles and other woodwork 1¼" finished; such pieces must be taken from 1½" stock. Whereas if it is indicated 1/16" thinner or 1-3/16" it can be made from the 1¼" stock.

Pare down the thickness of all window sills so that they can be made out of thin stock, not over 2" rough or 1⅝" dressed.

Door jambs may be 7/8" thick with planed stop instead of 1⅛" or 1⅜" as often specified. Blocks for butt screws must then be used.

Consider the use of stock interior and exterior trim instead of special molds, stock window frames and sash and stock doors.

Door saddles may be omitted, especially from closets and secondary spaces.

Wood walls and wainscots may be economically secured to ½" or ¾" strips secured to masonry partitions instead of to 2" x 4" studs. Two coats of plaster under wood paneling are not necessary; they may be omitted and roofing felt used to better advantage.

Change doors from 1¾" thick to 1½" where possible, such as in closets, baths, etc.

Omit circular or round windows.

Instead of wood panels use thin wood veneer mounted on cloth and applied as wall paper. This is economical on old work that has plastered walls. This may be used over wall boards.

Change circular or curved stairs to straight run.

Panels:

Panels are often specified thicker than required. Three-ply panels where not over 18" x 18" need only be ¼" thick.

See that built-up 3 or 5-ply panels have not been specified where solid wood would be more economical.

Five-ply panels are made 3/8", ½", 5/8" and 13/16".

For wood paneling substitute boards vertically or horizontally laid. These are not much more expensive than plaster.

Inexpensive woods to consider for such are cypress, fir, spruce, Arkansas pine, Pondosa pine, redwood.

Closet Equipment:

Omit brass poles and sockets; use 7/8" wood pole and holes cut in hook strip.

Omit shoe shelves or racks.

Make shelves only one foot wide, one shelf only.

Wall Boards:

To be used in place of plaster for walls and ceilings; make substitutes in basement and attic.

Beveled joints showing frankly are most satisfactory.

If boards are to be covered with textural paint, joints must be taped and nails set and covered with composition. Other possibilities for covering joints are batten strips, metal molds, shiplap joint or ashlar joints.

HARDWARE

Consider omissions of all locks for bedroom doors, closet doors, first-floor doors and use of latches only in residential work.

Consider butts for painting rather than plated or solid brass.

LATHING AND PLASTERING

See whether any furred ceilings can be omitted.

Cut gauge of lath to minimum. Galvanized lath not needed indoors.

Paper-back lath may cut plastering cost.

Consider the use of plaster board or plaster lath with two coats of plaster or one coat of plaster and one coat of plastic paint instead of metal lath and three coats of plaster. Use ½" grounds with this instead of ¾" as usual.

Plaster reveals in place of wood trim in windows.

Standing metal furring for fireproof construction in place of hollow tile furring.

Lath and plaster partitions in place of block partitions. This also saves space as partitions may be made 2¼" to 2½" thick.

Wood lath in certain localities is a slight saving.

Substitute hard white plaster finishes for sand finishes.

Omit all cement finishes where possible as these cost more than Gypsum finishes.

Secure prices on substitution of finished coat of colored plaster in place of plaster with usual paint finish. These are available both with oil colors and with water colors mixed in finish.

Use job mixed plaster instead of ready sanded type.

Consider use of wall boards with prepared fabric applied on same in place of plaster.

Omit plaster walls and ceilings in basement and attic; use wall boards.

GLASS AND GLAZING

Reduce plate glass to ⅛" thickness for windows and doors.

Window glass specified double strength in small lights may be changed to single strength.

Omit all curved window glass in curved bays.

In casement sash omit leaded glass and use steel muntins.

Omit large mirrors or reduce in size.

INTERIOR MARBLE

Omit marbles that require sticking, waxing or filling and substitute sound marbles that need no filling, sticking or liners to reinforce them. See that marble thicknesses are the minimum:

Marble floor tile ⅞" thick.

Marble wainscot over 12 feet high not over 1¾" thick.

Stair treads, platform, window stools, 1¼" thick.

Stall fronts and partitions may be 1" thick if well braced.

Use two angle connections for every stall instead of the usual three.

CERAMIC TILE

Substitute ceramic mosaic type for larger size floor tile as they are usually more reasonable.

Second-grade tile may be considered in certain types of work.

Machine-made floor tile may be considered as a substitute for faience floor tile.

Machine-made wall tile may be used in place of faience tile for walls with considerable saving.

Bathrooms:

Floors—cork, linoleum, mastic tile, rubber.

Walls—plaster with linoleum, canvas painted, waterproof paper, oilcloth or simply cement plaster with color, asbestos imitation tile, metal sheet tile, strip rubber wainscot.

Kitchens:

Floors—linoleum, rubber, cork.

Walls—Keene cement with paint, plaster with canvas and paint, oilcloth, linoleum, waterproof paper, asbestos imitation tile, metal sheet tile, rubber wainscot, colored cement—color troweled in.

TERRAZZO

Magnesite terrazzo floors may be laid over wood and are only ¾" thick.

New type of diamond terrazzo strip allows cement terrazzo floors to be laid over wood at a low price.

Where floor area is large terrazzo may prove cheaper than tile.

Consider the use of other bases with terrazzo floor. The expensive part of terrazzo flooring is the border near the wall and the base. The combination of terrazzo floor with tile border and base or mastic tile border and base or magnesite border and base may reduce cost.

Omit heavy division strips for economy. Divisions may be maximum of 25 square feet with no side longer than 5 feet.

Terrazzo stairs, treads and risers may be substituted for expensive materials. Secure figures on both precast and made-in-place type.

For terrazzo floor substitute low-cost tile such as ceramic mosaic, Flint's or slate, soapstone, colored cement, magnesite.

CORK FLOORING

Large sheets of cork 18" x 36" are most economical for both material and labor as this is the size of manufactured sheets; ⅝" thickness is sufficient but ½" must be used on floors over earth.

Cork floors with a cork tile finish often prove less expensive than wood floors of the better type.

LINOLEUM FLOORS

Floors of 16 mm. thickness though necessary on commercial work are not necessary for residential work. For ordinary bath or kitchen floors "B" thickness is sufficient. Inlaid designs are usually more expensive than plain colors or Jaspé. For halls with heavy traffic 3/16" thickness may do in place of 16 mm.

Linoleum base may be used with more expensive floors.

Linoleum center strips with border and base of colored cement may be used in place of more expensive soft floors such as cork or rubber.

ASPHALT TILE

This is low in price at present and good colors are obtainable. It may be substituted for more expensive floors such as tile and rubber or cork except where grease is prevalent. Asphalt base may be used for other bases and costs little more than wood base.

RUBBER TILE

Wide rubber strips are now obtainable in place of tile for use in halls and corridors and the setting price is lower. Rubber wainscots may be used in place of marble or other expensive materials. Interior rubber-faced columns are

more durable than imitation marbles of the plaster type and very reasonable.

CEMENT FLOORS

Lay cement floor integral on basement slabs to save material.

Omit integrally colored cement floors and apply color to surface and trowel in or omit all color.

In unimportant basement spaces omit troweled floors and float the finish; or omit cement floors on slabs in such spaces.

WOOD FLOORING

Solid wide oak boards are being successfully used in place of veneered boards.

Strip oak flooring may be substituted for the above.

Red oak will prove more reasonable than white oak and straight grain will cost less than quartered. A mixture of quartered and plain grain will show a saving over all quartered plank flooring.

Rift grain pine flooring wears well and is low priced.

Masonite cushioned flooring gives the effect of a wood floor at a low price.

Often it is possible to use a very cheap grade of wood for plank floors when an antique effect is desired because small knots rather help than disfigure the effect. In such a case No. 1 Common board may be used in place of the usual clear or select grade.

PAINTING

Consider kalsomine for ceilings in place of oil paint.

For storage rooms and basement cold water paint in place of oil paint.

Casein paints are proving economical because of their covering capacity in a few number of coats.

Where stained effects are required these can often be obtained by the use of thin coat of stain, shellac and wax in place of several coats of varnish. Two coats of stain such as Minwax give results both inside and outside at minimum expense.

Quick drying varnishes save considerable time and money in application over the old type of slow drying varnish.

Where four or five coats of paint are specified for interior work, cut to two or three coats, so that when plaster cracks have occurred, other coats may be applied to cover at a later date.

SCREENS

Architect's specifications are usually very stiff in screen requirements and where cost must be cut to the limit screens such as used by the builders must be considered. Full-length screens on the outside of double-hung windows and half-length screens are much less expensive than the twin sliding or hinged screens.

PLUMBING AND DRAINAGE

See that advantage is taken of all parts of the plumbing code where savings can be made. Many small towns allow loop venting for houses. Often a nonsyphon trap in place of the usual vent will cut costs.

Tubs built in alcoves cost less than corner tubs and require no more wall surface.

Consider rearrangement of fixtures to cut down piping cost. The cheapest arrangement is toilet with soil pipe behind; then tub and lavatory on same wall or adjacent to each other.

Baths should be located over other plumbing fixtures and back to back where possible.

Vents may be connected together in roof space requiring only one vent through roof.

Size of water lines may be reduced by installing tanks for toilets in place of flush valves.

Fixtures may be reduced in size such as 5′ tubs in place of 5′ 6″; 20″ x 24″ lavatories in place of 27″ x 22″, etc.

Stop cocks on lines may be omitted.

Circulating hot-water system may be omitted or limited.

Number of hose bibbs may be reduced.

Catch basins in yard may be made of sewer pipe on end with cast-iron grating instead of building brick or concrete catch basins.

In porous soil omit leader drains and spill on stone slabs or brick. This is very feasible where no basement is built.

All plumbing fixtures may be enameled iron instead of china.

Closets may be reverse trap type instead of syphon jet.

Omit shower inclosures around tubs where same are of glass. Substitute curtains.

Glass, marble or tile shower inclosures may be changed to ready-built steel painted inclosures.

Omit showers and curtains over tubs.

Shower partitions and toilet stalls may be made of enameled steel rather than more expensive materials.

Omit area drains and pave with loose brick, gravel or crushed rock.

Omit floor drains and fixtures from basement so that house sewer may be raised to save deep trench and the like. Omit garage floor drain and pitch floor to doors.

ELECTRIC WIRING

BX cable instead of conduit in frame construction.

Re-locate panel boards and fuse boxes to shorten runs.

Consider lightweight conduit instead of standard conduit in fireproof construction.

Cut down number of outlets where possible making all convenience receptacles duplex and grouping outlets near together and back to back. Convenience outlets located at corners of rooms will serve both walls.

Consider use of new type of box and cover which allows for three items in each in place of the usual two.

Omit three-way switches where not essential.

Use pull cord on all fixtures where possible.

HEATING

Triple-duty boiler to combine:

Incinerator.
Water heater.
Boiler.

Omit oil or gas burner but consider extra cost of coal bunker and chute.

If vapor system is specified it may be changed to a two-pipe steam or, in small work, to a one-pipe steam system with vacuum air control valves.

The hot-water heating system may be reduced in cost by substituting a steam or hot-air system.

Hot-air systems for small houses may save over other types.

Radiator Inclosures:

Instead of half-inch asbestos radiator lining with galvanized iron over same, build of half-inch wall board with sheet aluminum foil facing. The efficiency of such an inclosure is high.

LANDSCAPE

Exterior work may often be accomplished more economically if divorced from the general contract and done after the building is completed.

This work may include paths and walks.

Paths may be considerably cheapened if construction is flag or slate on cinder concrete slab with cinders under.

Constructed of
COPPER AND BRONZE THROUGHOUT

PENBERTHY AUTOMATIC ELECTRIC SUMP PUMPS

Maximum Capacity 3600 Gals. per Hr.

Model K
Made in 5 Sizes
Retail Price
(Size No. 1 K)
$65.00

Maximum Capacity 1400 Gals. per Hr.

Model 33
Made in 1 Size only
Retail Price
$39.50

Their performance is as superior as the materials from which they are made. There is a Penberthy Pump for every purpose . . . and to suit every pocketbook.

PENBERTHY INJECTOR COMPANY
Manufacturers of Quality Products Since 1886
Detroit, Michigan **Windsor, Ontario**

PENBERTHY PRODUCTS

SELECT THE PUMP THAT SUITS THE PARTICULAR CONDITIONS

* * *

DON'T TRY TO SUIT THE CONDITIONS TO A PARTICULAR PUMP

NRA

PENBERTHY AUTOMATIC CELLAR DRAINERS
(Water and Steam Operated)

MODEL S
Made in 1 Size Only
Maximum Capacity
600 gallons per hour
Retail Price . . $14.50

MODEL R
Made in 2 Sizes

	Max. Cap. gal. per hr.	Retail Price
1R	720	$25.00
2R	1240	40.00

MODEL L
Made in 3 Sizes

	Max. Cap. gal. per hr.	Retail Price
3L	1650	$ 55.00
4L	2400	80.00
5L	3200	110.00

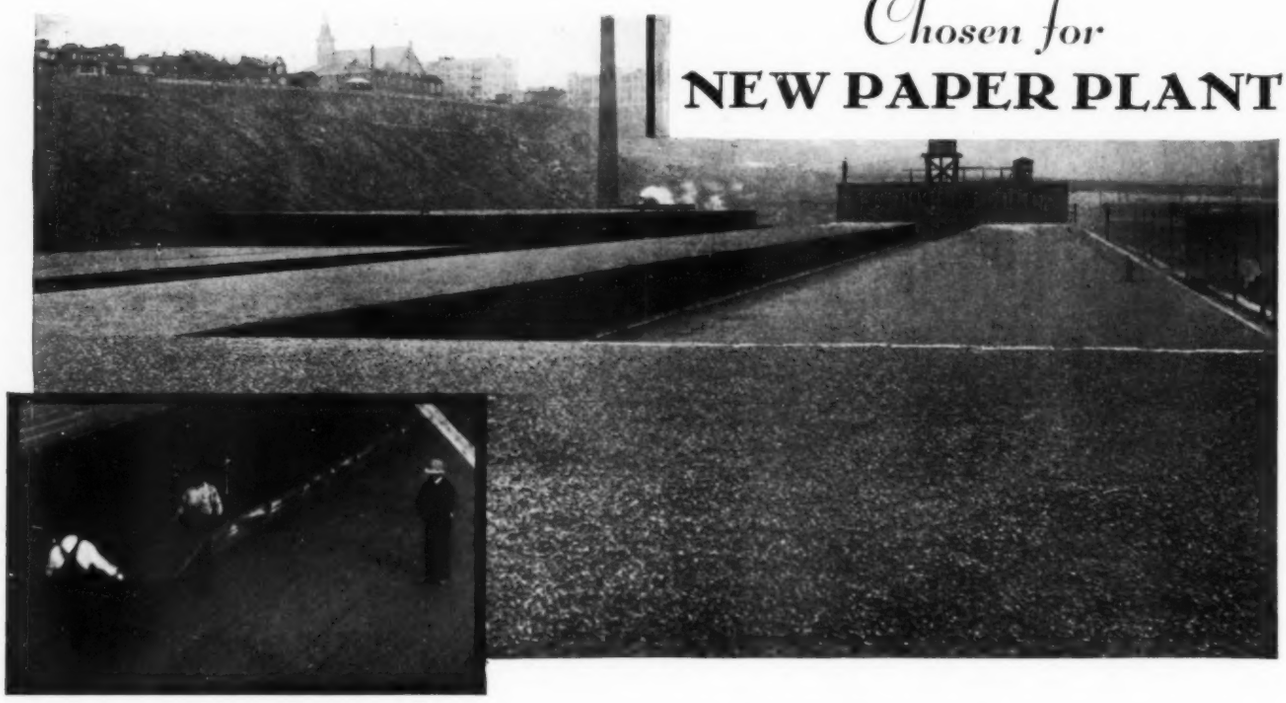
ALL PRICES ARE F.O.B. DETROIT

PENBERTHY PUMPS REMOVE SEEPAGE WATER

RU-BER-OID Built-Up Roof

Chosen for

NEW PAPER PLANT



New plant of Hinde & Dauch Paper Company, Hoboken, N. J., roofed with 130,000 square feet RU-BER-OID Coal Tar Pitch and Felt Built-Up Roofing. Engineer-Contractor, Otto Randolph, Inc., Chicago, Illinois. Roofer, Bogota Sheet Metal Co., Bogota, N. J.

Known Quality Standards

Decide Selection of

130,000 Square Feet Roofing Job

THE name RU-BER-OID is known the world over as symbolic of quality—the best quality that your roofing dollar can buy. That's why Hinde & Dauch selected a RU-BER-OID Built-Up Roof for their new paper plant in Hoboken.

Architects the world over and engineers of leading industries choose RU-BER-OID Built-Up Roofs with a feeling of confidence. They know that back of the name *Ruberoid* is an enviable record of roofing service, and an investment of many millions of dollars.

Today, RU-BER-OID Built-Up Roofs may be had in all three popular types—Asbestos Saturated Felt and Asphalt, Tarred Saturated Rag Felt and Coal Tar Pitch and Asphalt Saturated Rag Felt and Asphalt—a roof to fit every building requirement and every purse.

Whatever your roofing problem may be, think of RU-BER-OID—then turn to Sweets. Should you desire further information or have special conditions to meet, there is an engineer in each of the Ruberoid offices who will gladly counsel with you. Phone the nearest office when we can be of service.

RU-BER-OID ARCHITECTURAL PRODUCTS

- BUILT-UP ROOFS
- ASBESTOS SHINGLES
- ASBESTOS SIDINGS
- NEWMARBLE
- NEWTILE
- ASPHALT SHINGLES
- WATERPROOF SHEATHINGS
- CEMENT WATERPROOFING

The RUBEROID Co.

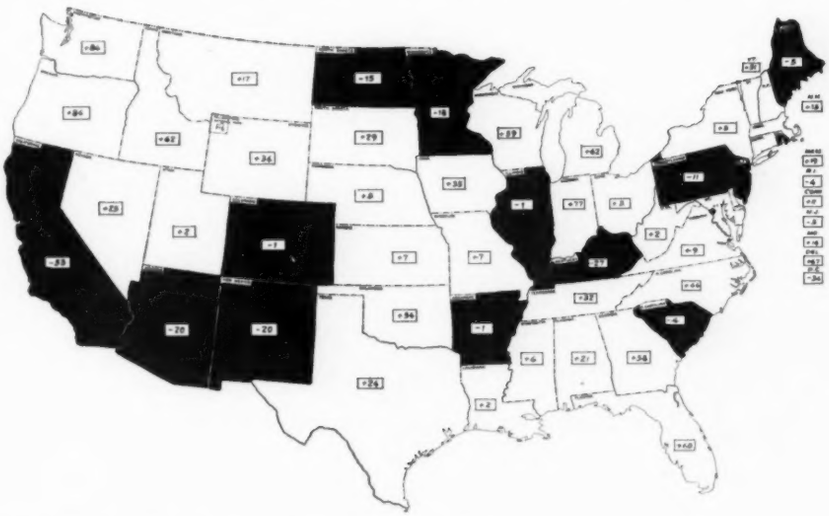
ROOFING MANUFACTURERS FOR OVER FORTY YEARS

Sales Divisions: —CONTINENTAL ROOFING MILLS—SAFEPACK MILLS—H. F. WATSON MILLS—ETERNIT MILLS. *Offices and Factories:* NEW YORK, N. Y.—CHICAGO, ILL.—MILLIS, MASS.—ERIE, PA.—BALTIMORE, MD.—MOBILE, ALA.

SEE 1934 SWEETS ARCHITECTURAL CATALOGUES

BUILDING TRENDS AND OUTLOOK

BY L. SETH SCHNITMAN
CHIEF STATISTICIAN
F. W. DODGE CORPORATION



BUILDING DURING 12 MONTHS — JULY, 1933 - JUNE, 1934, INCLUSIVE. Corresponding twelve months ended June, 1933, taken as base. SHADED AREA: BELOW BASE. UNSHADED AREA: ABOVE BASE. Figures denote percentage change from base. Floor space for new building contracts, 37 states east of the Rocky Mountains. Permit valuations for Rocky Mountain and Pacific coast states. Map, copyright American Map Co., N. Y. Authorized reproduction No. 5025.

HALF YEAR SHOWED LARGE GAIN

Construction awards of all descriptions during June were within 5 per cent of the total recorded for May and exceeded the June, 1933, dollar volume by about 24 per cent. For the 37 eastern states the June contract total amounted to $127,-131,200. Of this amount $73,308,200 was for construction projects financed from public funds, chiefly PWA; this represents more than 57 per cent of the total as contrasted with a ratio of 53 for May and only 28 for June of last year.

Contracts for construction during the first half of 1934 showed a decided improvement over both the 1933 and 1932 half-year totals. The cumulative total for the 37 states amounted to $854,320,200 for the initial half of 1934, which is almost twice last year's total of $432,113,400 and 28 per cent greater than the comparable figure of $667,079,200 recorded for the first six months of 1932.

Privately-financed contracts reached a total of $282,487,100 during the first half of 1934 as compared with $270,648,600 for the corresponding period of 1933 and $331,904,300 for the first half of 1932. Publicly-financed awards, on the other hand, attained a total of $571,833,100 for the first six months of 1934 as contrasted with only $161,464,800 for the like period of 1933 and $335,175,400 for the initial half of 1932.

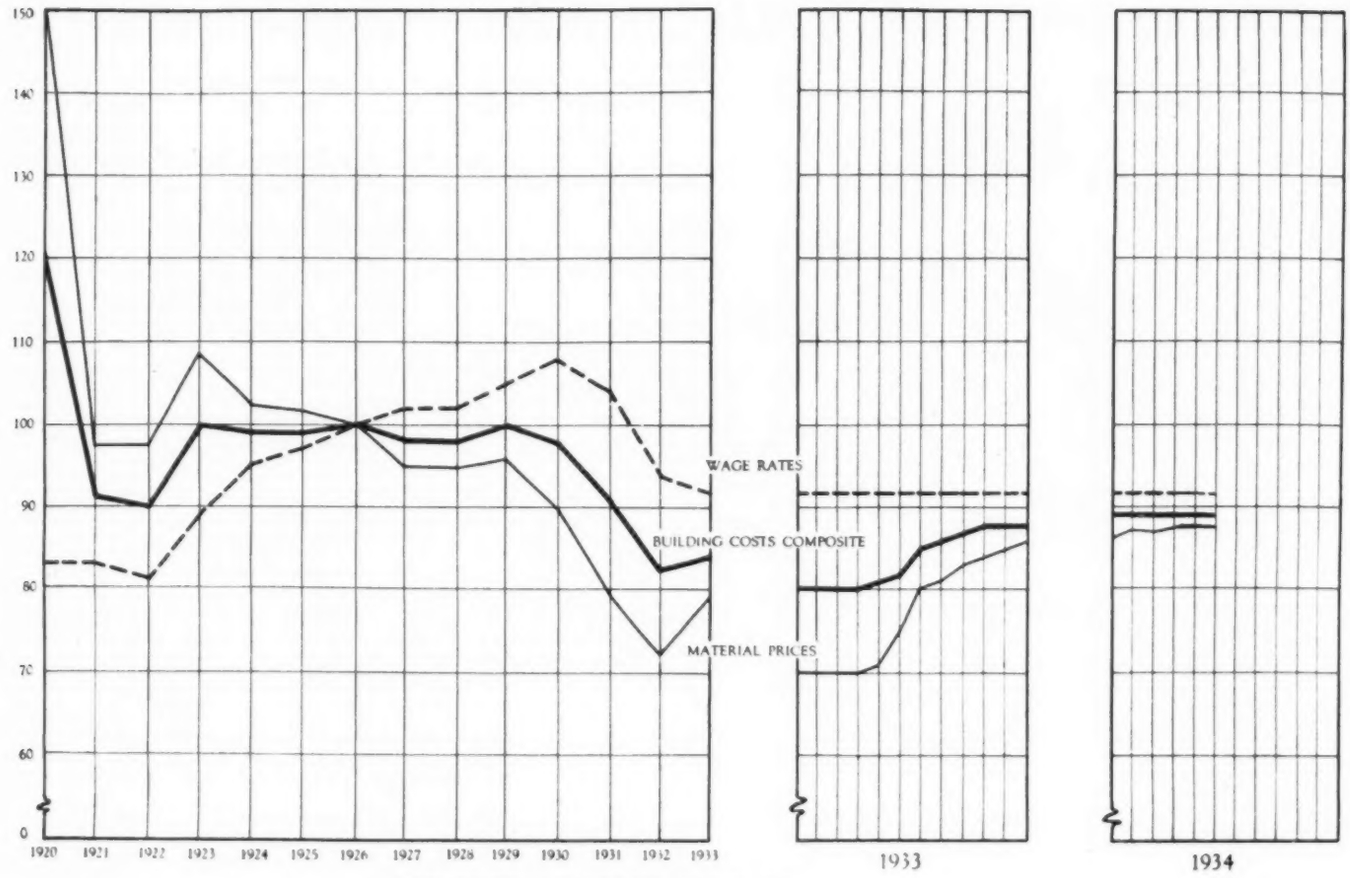
Contemplated construction reported during June was greater than in May but the recorded volume of proposed work was below the total shown for June of last year.

MATERIAL PRICE MEASURING ROD

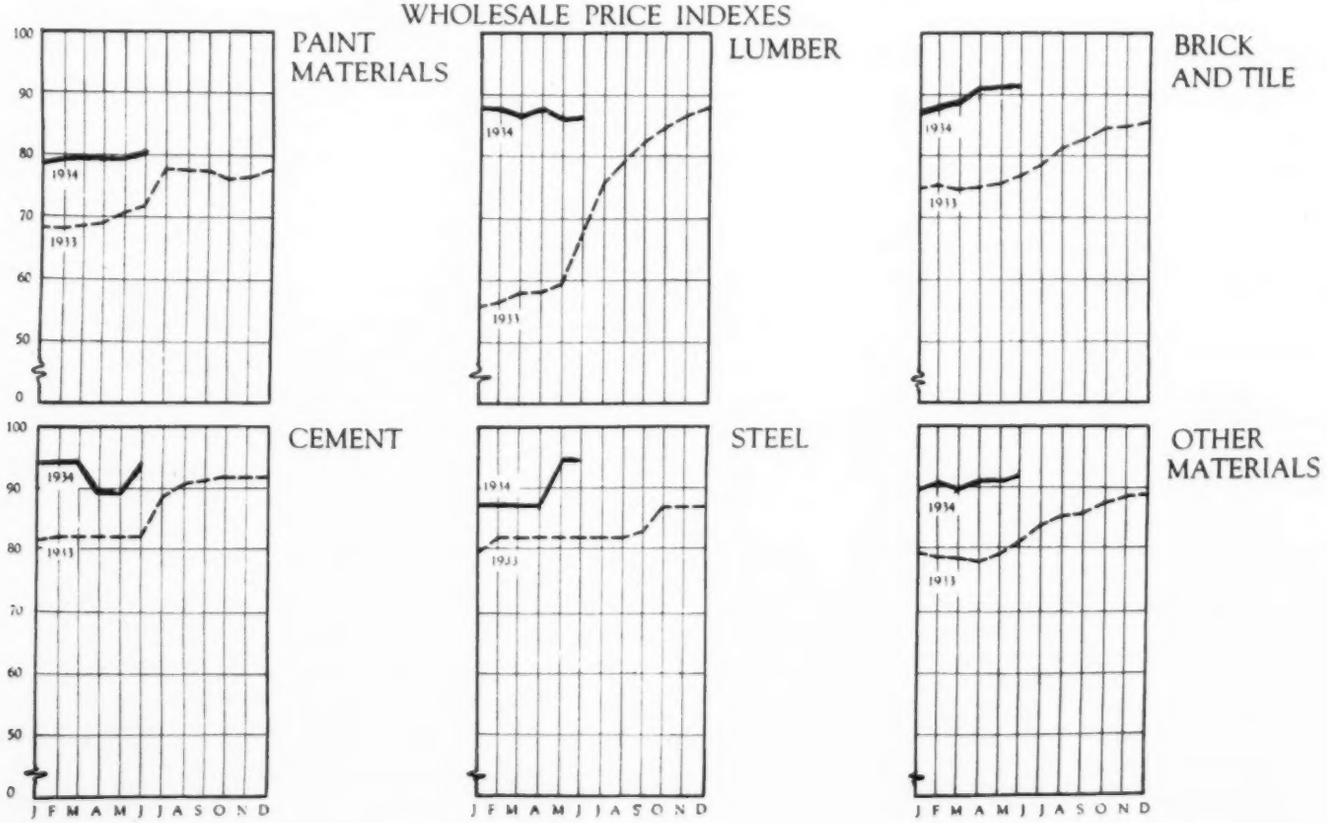
F. W. DODGE CORPORATION
COMPOSITE PRICES

MATERIAL	This Month	Month Ago	Year Ago
Portland Cement	$2.25	$2.25	$2.10
Common Brick	14.84	*14.94	11.81
Structural Steel	1.65	1.65	1.60
Lumber	16.40	16.40	15.60

The prices in this tabulation enable one to visualize at a glance the main trend of the material market. Their significance does not extend beyond that point, and the explanation should be read carefully. Prices given in this comparison are composite and do not in all cases refer to one item. For instance, the price of structural steel is the composite of prices of shapes and plates f.o.b. Pittsburgh; the price of lumber is a composite of five items of Southern pine and five items of Douglas fir f.o.b. mill; the price of cement is a composite of prices in fourteen different cities per barrel, carload lots, to contractors; price of brick is composite in fourteen cities per M. delivered on the job. *Revised.



WHOLESALE PRICE INDEXES



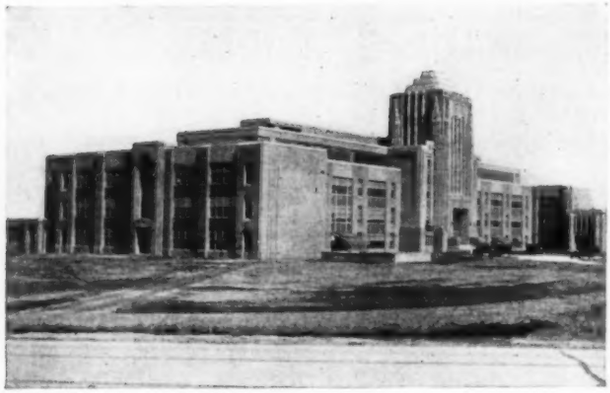
WAGE SCALES IN THE BUILDING TRADES

Information Furnished by National Association of Builders Exchanges and Compiled by Division of Statistics and Research, F. W. Dodge Corporation, as of May, 15, 1934

	Asbestos Workers	Bricklayers	Bricklayers Tenders	Carpenters	Cement Finishers	Electricians	Hoisting Engineers	Iron Workers—Ornamental	Iron Workers—Structural	Laborers	Lathers	Painters	Plasterers	Plasterers' Tenders	Plumbers	Roofers—Composition	Roofers—Slate & Tile	Sheet Metal Workers	Steamfitters	Stone Masons	Tile Setters	Tile Setters' Helpers
Akron	$1.00	$1.25	$0.45	$0.70	$0.70	$0.75	$0.70	$0.60	$0.60	$0.40	*$0.87½	$0.65	*$1.00	$0.62½	$0.85	$0.80	$0.80	$0.80	$0.85	*$1.25	*$1.25	*$0.50
Atlanta	1.00	1.25 1.40	‡.30 .45	.70	1.25	.90 1.10	.60 1.00	.35 1.85	1.25	.25 .35	1.00 1.25	.75	1.25	.30 .45	1.25	.80	.80	.90 1.00	1.25	1.00 1.25	1.25	.40
Baltimore	1.00	*1.00	1.00	1.10	*1.00	*1.00	*1.25	*1.37½	*1.37½	.20 .30	*1.25	.80 *.90	*1.25	1.00	*1.00	.75	.75	*1.12½	*1.00	1.00	1.25	.72
Boston	1.25	*1.30	.70	*1.17½	1.17½	*1.25	1.17½	*1.20	*1.20	.70	*1.50	*1.12¼	1.37½	*.95	*1.25	*1.17½	*1.05	1.17½	*1.25	*1.30	*1.30	*.95
Buffalo	1.00	*1.25		*1.00	.90	*1.00	1.00	1.12½	1.12½	.35 .50	1.00	*1.00	1.00		1.00	.50	1.00	1.00	*1.00	*1.25	*1.18¾	
Chicago	1.37½	1.50	.82½	*1.31¼	1.31¼	1.50	1.31¼	1.31¼	1.35	.82½	*1.50	1.33⅓	*1.50	88¾	1.37½	1.37½	1.50	1.37½	1.37½	1.50	1.37½	1.00
Cincinnati*	1.15	1.25	.70	1.20	1.02½	1.25	.80 1.25	1.25	1.25	.45	1.31¼	1.15	1.37½	.70	1.25	.92½	1.07½	1.07½	1.12½		1.00	
Cleveland*	1.17½	1.25		1.12½	1.12½	1.37½	1.12½	1.25	1.25	.72½	1.25	1.20	1.25		1.25	1.15	1.37½	1.12½	1.25		1.25	.81¼
Columbus	1.00	1.30	.62½	.80	.80	1.00	1.15	1.25	1.25	.40	1.00	.80	1.00	.62½	1.00	.80	1.00	.80	1.00	.75	1.25	.50
Dayton*	1.25	1.30	.80	1.00	1.15	1.55	1.25	1.35	.50	.50	1.10	1.00	1.20	.80	1.00	.85	1.00	1.00	1.00	1.30		
Denver††	9.00	12.00 *13.00	6.50 7.00	10.00	10.00 11.00	10.00 11.00	10.00	10.00 11.00	10.00 11.00	4.00 5.00	11.00	*10.00	12.00	7.00	11.00	7.00 8.00	7.00 8.00	9.00	9.50	12.00 13.00	10.50	†.62½
Des Moines	1.00	1.25	.67½	1.00	1.00	1.00	1.00	1.00	1.20	.55	1.00	1.25	1.25	.67½	1.00	1.00	.87½	.87½	1.00	1.25	1.25	.67½
Detroit	1.37½	1.25 max.	.55 .60	.80 1.00	.70 .90	1.25 1.40	.60 1.00	1.00 1.20	1.00 1.25	.50 .55	1.37½	.80 1.00	1.00 1.25	.70 .80	1.00 1.50	.70 .90	.80 1.00	.80 1.00	1.25 1.50	1.25 1.50	1.00 1.25	.80
Duluth	1 00	1.00	.50	.80	.80	1.00	.80		1.00	.50	.80	.80	1.00	.70	1.00	.70	1.00	.85	1.00	1.00	1.00	1.00
Erie		1.00	45 .50	.80	.80	.90 *1.00	.90	.60 .80	.90	.40	.90	.60 .70	1.00	.40 .50	1.00	.50 .60	.80 .90	.80 .90	*1.00	1.00	.80	.40 .50
Houston		1.00	.35	.75	.75	1.00	.75	1.00	1.00	35		.62½	1.00	.35	1.00	.75	1.00		1.00	1.00	1.00	
Indianapolis	1.22½	1.62½	.90	1.22½	1.17½	1.50	1.37½	1.45	1.45	.40 .45	1.37½	1.25	1.57½	1.00	1.00	.60 .90	1.27½	1.22½	1.50	1.62½	1.50	.60
Kansas City	.90	1.32½	.80	1.00	1.00	1.00	1.00	1.00	1.00	.60	1.00	1.00	1.06¼	.80	1.00	.92½	.92½	1.00	1.00	1.12½	1.25	.62½
Los Angeles††	10.00	8.00	6.00	7.00	8.00	7.00	8.00	9.00	10.00	4.00	10.00	7.00	9.00	6.00	9.00	7.00	7.00	8.00	10.00	8.00	6.00	†.7
Louisville	1.12½	1.00	.50	.80	1.00	1.00	1.00	1.00	1.00	.40	1.12½	.90	1.00	.50	1.12½	.40	.85	.85	1.12½	1.25	1.00	.50
Memphis	1.00	1.37½	.50	.50	.50	1.00	.75	.75	.75	.30	1.00	.75	1.25	.50	1.25	.25 .40	1.12½	1.12½	*1.25	1.37½	1.25	.50
Milwaukee	1.00	1.00	.75	.92½	1.00	1.25	1.00	1.05	1.05	.60	1.00	1.00	1.00	.75	1.00	1.00	1.00	.92½	1.00	1.00	1.00	.65
Minneapolis	1.00	1.00		.80	80	1.00	.80	.90	1.00	.45	.75 .85	.80	1.00	.70	1.00	.70	.70	.80	1.00	1.10	1.00	.65
Nashville		1.00		.60 .75	.50	.75		.60	.75	.40	1.00	.62½	1.00		1.00	60	.60	.60	.75	.50	.75	
New Haven*		1.20	.50 .60	.80 1.06¼	1.20	.80 1.00	1.16¾ 1.27½	1.37½	1.37½	45 .65	1.27½	.80 1.00	1.20	.50 .60	1.06¼		1.50	1.06¼	1.06¼	1.20	1.20	
New Orleans	.65 .80	1.25	.85	.55 .75	1.00	1.25	1.25	1.25	1.25	.35 .50	1.25	.75 .90	1.25	.75	1.00 1.25	.40	.90 1.15	.90	1.05 1.25	1.50	1.25	.35
New York City††	11.20	12.00	7.00	11.20	c11.20	11.20	13.20	11.20	13.20	6.60	11.20	9.00	12.00	8.50	c12.00	10.28	12.62	11.20	11.20	12.00	11.50	8.50
Oakland††	6.40	10.00	5.60	7.20	7.20	8.00	8.00	7.20	9.60	5.00	8.00	7.00	8.80	6.00	8.00	6.40	6.40	8.00	9.00	8.00	8.00	5.00
Oklahoma City††	8.00	8.00	4.00	6.00 8.00	8.00	6.00 8.00	8.00	8.00	8.00	3.50	.80	7.00 8.00	.80	4.00	.80	6.00	6.00	8.00			11.00	†.62½
Omaha	1.32	1.12½	.45	.90	1.00	1.00	1.00	.90	.90	.50	.90	.80	1.12½	.45	1.00	.72½	.95	1.00	1.00	.90	1.00	.50 .60
Philadelphia	1.00	1.50		1.00	1.05	1.25	1.18½	1.25 1.37½	1.00 1.37½	.40	1.37½	.70	*1.37½	.90	1.15	1.00	1.25	1.25	1.25	1.00	1.25	
Pittsburgh	*1.50	*1.50		*1.25		*1.56¼	1.37½ 1.43¾	*1.37½	1.37½	.70	*1.50	.87½	*1.50		1.50	*1.25	*1.50	*1.31¼	*1.50	*1.40	1.33¾	88.
Portland, Ore.††	8.00	*9.60	7.20	7.20	*7.20	*8.00	6.40 9.60	8.80	8.80	4.80	*8.80	7.04	*9.60	*7.20	*8.80	7.20	7.20	*8.00	*8.80	*9.60	8.00	7.20
Reading	.80	.80	.60	80	.80	.80	.80	.80	.90	.40	.90	.63	.90	.60	.90	.80	.80	.70	.90	.70	.75-1.15	.50
Richmond	.60 .65	1.25		.60	.35 .40	.80		.70	.70	.40	1.00	60	.60		.90	.60	.60	1.00	.90	1.25	1.25	
Rochester	.91	1 25	.55	1.05	*1.25	*1.15½	.90	.70-*1.00	.70-1.00	.55	.90	*.90	*1.25	.55	*1.06¾	*.80	*.80	.90	*1.06¾	*1.25	1.12½	.47½
Salt Lake City ††		9.00	5.00	7.20	8.00	1.12½	1.12½	1.12½	1.12½	4.00	1.10 1.25	7.20	1.50	1.10	8.00	7.20	8.00	8.00	8.00	9.00	8.00	4.00
San Antonio††	6.00 10.00	6.00 10.00	2.00 3.00	2.00 7.00	3.00 8.00	3.00 7.00	4.00 7.00	1.75 4.50	5.00 10.00	1.50 2.50	4.00 7.00	3.00 7.00	4.00 8.00	2.00 3.00	5.00 8.00	5.00 6.00	4.00 6.00	3.00 7.00	5.00 8.00	3.50 8.00	4.00 10.00	2.00 3.00
San Francisco	6.40	9.00	7.00	7.20	7.20	9.00	9.00		9.60	5.00	8.00	7.00	8.80	7.50	8.00	8.00	8.00	7.20	8.00		8.00	5.00
Seattle††	8.00	9.60	5.28	7.20	7.20	*8.80	8.00	8.00	8.80	4.75	*8.80	7.20	*9.60	*6.40	*8.80	7.20	7.20	8.00	*8.80	9.60	8.00	
Sioux City	1.00	1.25	.50	1.00	.75	1.00	1.00	1.00	1.00	.50	.90	1.00	1.25	.60	1.00	.90	.90	.85	1.00	1.25	1.00	.60
St. Louis	1.25	1.50	1.00	1.25	1.31¼	1.50	1.35- 1.47	1.47	1.47	.78¾	1.25	1.25	1.50	1.06¼	1.43¾	1.17½	1.25	1.25	1 43¾	1.25	1.25	.76½
St. Paul	1.00	1.00		.80	.80	1.00	.80	1.00	1.00	.50	.90	.80	1.00	.70	1.00	.80	80	.85	1.00	1.00	1.00	
Washington, D.C.	*1.50	1.75	.50 .75	*1.37½	1.25	*1.65	*1.37½	*1.65	*1.65	.75	*1.62½	*1.37	*1.75	*.75	*1.50	*1.37½	*1.37½	*1.50	*1.50	*1.25	*1.50	.75
Wichita	.60	.75 1.25	.35 .40	.40 .75	.40 1.00	.50 .87½	.30 .75	.40 1.00	.40 1.00	.20 .40	.50 1.25	.50 .87½	.60 1.25	.25 .50	1.00	50 1.00	.50 1.00	.50 1.00	.75 1.12½	.75 1.25	.50 1.00	.25 .40
Youngstown††	*1.00	1.25	.60	.75-1.00	1.12½	1.00	1.12½	1.25	1.25	.40	1.00	1.00	1.25	.75	1.00	1.00	1.00	1.00	1.00	1.25	1.25	.81¼

NOTE.—Where two figures are shown they are the minimum and maximum. All figures are for hour rates except as indicated. ††8-hour day. ‡5-hour day. †Rate per hour.
*On 5-day week basis. cCorrection. Asterisk after city indicates all trades on five-day week basis.

ABOVE DATA ARE WAGE SCALES AND DO NOT NECESSARILY INDICATE ACTUAL WAGE RATES BEING PAID IN THE RESPECTIVE TRADES.



NEW
HIGH SCHOOL
FOR GIRLS

100%
A.P.W.

THE recently completed Bloom Township High School, Chicago Heights, Illinois, is a modern school in every sense of the word. In its equipment no detail has been overlooked that could safeguard the health of its girl students so that they may take full advantage of the finest of present-day educational facilities. Even the washroom appointments reflect an acknowledgment of the importance of health. For this building is equipped throughout with A.P.W. Onliwon Towels—dispensed from white enamel A.P.W. Onliwon Cabinets.

A.P.W.

A.R. 8-34

A.P.W. PAPER CO., Albany, N. Y.

Please send me, free, the latest catalogue of A.P.W. Cabinets and Fixtures.

Name.....

Address.....

City.....*State*.....

THE FIRST SKYSCRAPER?

(Continued from page 118, editorial section)

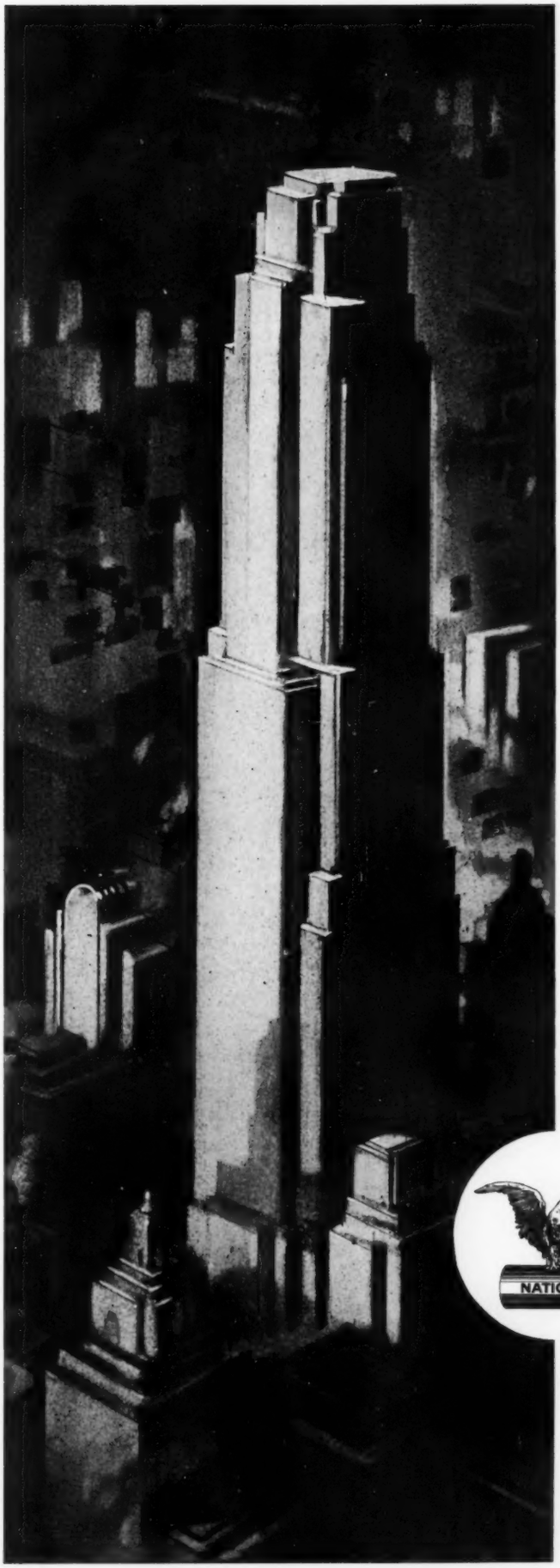
the fourth, sixth and ninth floors and at the roof on the street fronts, rolled spandrel beams rested on brackets and were loosely bolted to lugs cast on the posts. At the fifth, seventh, eighth and tenth floors no lateral bracing was provided for the verticals and we have the condition, in two vertical units of a bay, of one post standing on an unbraced post beneath, and in one unit, of three superimposed posts with two contiguous unbraced joints. Where is the stability?

In point of fact the frame could not have maintained itself in an upright position had it not been for the massive alley and line walls; and the posts in the street fronts could not have maintained themselves laterally had not the masonry of the piers been carried up simultaneously with the iron to brace the verticals and to take the wide cast-iron lintels which occurred, unbolted to the frame, at the fifth, seventh, eighth and tenth floors. Nor did the metal structure sustain the masonry piers of the street fronts (and only incidentally did they sustain three of the eight spandrel walls in each bay). When once the masonry had "set" an entire story of it on the street fronts might have been removed with small damage to the remainder; but no masonry pier could have been installed until that immediately beneath was in place or, as the Engineering Society's report notes, "unless a temporary support had been provided." Major Jenney's notion, expressed later, that he used iron to lighten the load on the Chicago soil must have come as an afterthought. It must have been the need of light which influenced him for it would not take as great a dead load of masonry to serve as piers in his street fronts as he used in his line wall on the same lot with the same soil conditions.

When it comes down to a matter of *priority* there is absolutely no first "skeleton frame," as we know it, in the world. The most nearly perfected of recent types contains some element appearing in the rudimentary structures; but the elements are so numerous that not all appear in any one design. So far as I now know, Holabird and Roche were new and bold in their application of *terra cotta* as an envelope to the iron in the street fronts, especially as to the spandrels, of the Tacoma Building which followed the Home Insurance Building by two or three years. But in that building, as in the other, the metal structure could not have maintained itself without the assistance of masonry walls. I know that in the middle of the nineteenth century in Europe the builders were translating half timber construction into terms of rolled shapes; and I saw in benighted Spain (though one could hardly call Barcelona benighted even then) tall buildings, taller than ours, under construction with thoroughly braced frames of rolled iron to which the masonry in which the metal was embedded was applied when and as the builder wished. This phenomenon I described in a letter written in 1883 to the *Inland Architect*.

Major Jenney was a great student of Viollet-le-Duc but was timid about putting that author's ideas, except as to style, into effect—that is, if he even sensed their implications. That Chicago was alive to progress in construction and design in the early eighties, her buildings, as well as a brochure by Architect Frederick Baumann, which I have in my possession, fully attest. However, it may be set down with a fair amount of assurance that the structure of the original Home Insurance Building had very little or nothing in common with the modern skeleton construction and had little or no influence on "Skyscraper" design.

—IRVING K. POND.



ARCHITECTURE *knows*

ONE PEERLESS NAME FOR PIPE

American architecture, through its leaders everywhere, and for all types of buildings, registers one dominant choice in its consideration of pipe. Long accumulated experience in designing and in the scrutiny of materials, careful observation of results in use, a developed sense of responsibility to clients—all these have entered into the collective judgment of the architect. It is by pre-eminence in service that NATIONAL Pipe has become preeminent in favor. On merit alone it has won its place in the most noteworthy buildings of recent years. Pipe adapted to the routine uses of plumbing and heating—tubes of costly and marvelous alloys for highly exacting demands, whether ornamental or structural—pipe and tubes of shapes, dimensions, and properties to cover the whole range of specification are offered under the name NATIONAL by the largest manufacturer of tubular products in the world.

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

NATIONAL PIPE

AMERICA'S STANDARD WROUGHT PIPE

NEW MATERIALS & EQUIPMENT

NEW CATALOGS
RESEARCH REPORTS
MANUFACTURERS' LITERATURE

Architects are invited to use the coupon on this page as a convenient means of obtaining manufacturers' publications describing in detail the products and materials mentioned

8A

NEW TUB-SHOWER-LAVATORY COMBINATION

The new combination bathroom fixture is called the "Lavashower." Within its seven-foot length it supplies a full length tub and a 40" lavatory. The tub floor is practically flat, the larger area providing every convenience of a stall shower. The whole unit is so compact that, with toilet, it can be installed in a room only 5' x 7'. This is of special importance in hotels, apartments, steamships, and other places where space is limited and costly. The Lavashowers, made of porcelain-enameled cast iron, will be available in white and standard colors for right or left hand recessed installation, or with lavatory-end finished for corner installation. It is being manufactured for Lavashower, Inc., by U. S. Sanitary Manufacturing Co.

8B

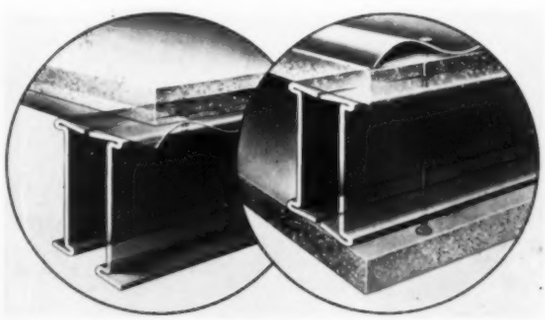
KOHLER CO.

Announcement is made that the Kohler Co. has taken over the manufacture and sale of the Niedecken Mixer, including the entire line of showers, hospital fittings and shower stalls. The Hoffmann & Billings Mfg. Co., which formerly manufactured these products, is discontinuing business.

8C

NEW DURIRON CENTRIFUGAL PUMPS

The Duriron Company, Dayton, Ohio, announces a bulletin (No. 172) on a new series of centrifugal pumps for acids and alkalies. Separate inserts will be issued on each pump giving the capacities, dimensions and rating charts. Included in the general bulletin, is a brief analysis of corrosion-resisting alloys in which the pumps are procurable. Features of the new pumps include a one-piece base with extra large clamping yoke cast integral; the volute is held under compression eliminating strain; closed type impellers are used with two or more sizes for each pump; bearings are removable bronze sleeves made of a special alloy, and the assembly is extremely simple. Several of the models are available in self-priming types as well as the standard centrifugal.



8D

CLIP-STRIP TENSION JOINTS

Use of clip-strip for applying porcelain enameled metal on building exteriors is described in a folder released by American Rolling Mill Co. Clip-strip is made of stainless steel. It provides two continuous tension joints that hold the porcelain enameled sheets in place and also flashes the joints, leaving a bead of stainless steel covering the joint. It permits the application or erection of flat sheets of porcelain enamel without special forming of the sheets themselves.

TO OBTAIN FURTHER INFORMATION

about any products mentioned, write the index numbers in space below. For literature about products *advertised* in this issue, give name of the product and manufacturer. Return coupon to The Architectural Record, 119 West 40th Street, New York, N. Y.

. . . . . .

. . . . . .

. . . . . .

Name_____

Position_____

Street_____

City and State_____

In 1924, the question was...
What kind of pipe?

TEN YEARS AGO the choice of pipe was between the rusting and non-rusting kind. One cost less to buy, but more to maintain. Gradually the economy factor . . . freedom from all upkeep expense due to rust . . . led to the widespread use of non-rusting pipe.

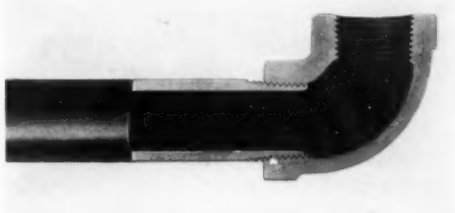
In 1934, the question is . . .
What kind of *rust-proof* pipe?

TWO kinds of rust-proof pipe are available today. Both promise absolute freedom from all repairs and replacements due to rust. Since the economy of rustless plumbing was first recognized, The American Brass Company has consistently recommended Anaconda Brass Pipe of the correct alloy for local water conditions. This recommendation is unchanged today, particularly since Anaconda "85" Red-Brass Pipe offers the greatest resistance to corrosion of any water pipe obtainable at moderate cost.

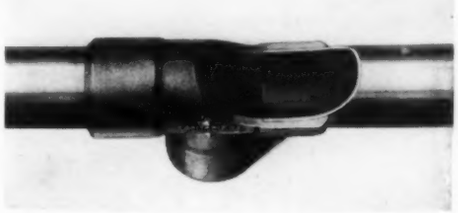
Copper Tubes

In addition to brass pipe, Anaconda Copper Tubes are now available with a complete line of Anaconda Bronze Fittings. These standard products are offered for underground service, as well as plumbing, heating and air-conditioning lines where low first cost is the influencing factor. Copper tubes are furnished hard in long lengths, and soft in coils; soft tubes may be readily bent for ordinary offsets, thus reducing the number of fittings required. And *copper tubes cost less per foot* . . . because they do not require threading and may, therefore, be made lighter in weight than standard size pipe.

Our new booklet, "Anaconda Copper Tubes and Fittings", will be mailed on request.



Cut-away section showing a perfectly cut threaded assembly of Anaconda Brass Pipe with a correctly tapered screw fitting.



Completed joint of Anaconda Copper Tube and Anaconda "Solder" Fitting. Elimination of threading permits use of lighter weight pipe.

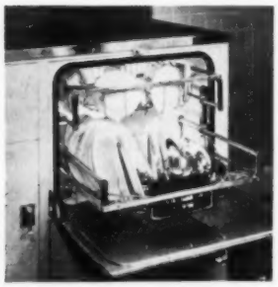
ANACONDA
From mine to consumer

THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut
Offices and Agencies in Principal Cities
In Canada: ANACONDA AMERICAN BRASS LTD., NEW TORONTO, ONTARIO

ANACONDA COPPER & BRASS

8E

NEW LINE OF DISHWASHERS



The new Westinghouse electric dishwasher line is comprised of one cabinet and three portable type machines. The entire line employs a washing process that uses ordinary soap chips. Every dish is washed for five minutes, double rinsed, and thoroughly dried by evaporation. Interior of the dishwashers is self cleaning. Porcelain enamel dish-tank is thoroughly washed and rinsed in the dishwashing process. The water is pumped from the dishwasher into the sink by centrifugal pump discharge and drains through the sink outlet. Cabinet type dishwasher requires only a 48″ x 25″ floor space. Because of the oven-type arrangement the entire worktop is usable as a work-table surface. The dishwasher can be installed as a complete unit or in combination with other cabinet bases. The cabinet base is installed flush with the top, twenty-five inches from the wall, with toe-room space. Ease of installation is claimed as the faucet and sink trap connections are the only plumbing required. It takes a single trap at regular height for ordinary sink.

8F

STURTEVANT AIR CONDITIONING

"Air Conditioning for Comfort," a booklet published by Sturtevant Cooling and Air Conditioning Corporation, illustrates a variety of buildings in which Sturtevant equipment is in operation. Among the types of buildings illustrated, showing exterior and interior views, are public buildings, apartments, stores, showrooms, office buildings, banks and theaters.

8G

NEW CAULKING SPECIFICATIONS

New specification sheets on caulking and painting for masonry buildings are released by Tremco Manufacturing Co. of Cleveland. According to the manufacturer's statement, "as knowledge of the causes of the spalling of stone increases, and as knowledge of the causes of leaks in masonry building walls, cracking of stone, the setting up of stresses, etc., are better known, it will be recognized that the pointing of joints in masonry buildings with a plastic material is of primary importance."

8H

ZEPHYR AIR

Savage Arms Corporation of New York announces acquisition of Zephyr Air Equipment, including patent rights, manufacturing, and merchandising facilities. Illustration shows the Zephyr 60 air conditioning unit. Its functions include air circulation, purification, humidification, cooling and dehumidification. The refrigerating unit is a two-cylinder compressor, capacity 7,500 to 9,000 B.t.u.: water cooled condenser, double coil type; equipment includes automatic water valve and high pressure cut-out.

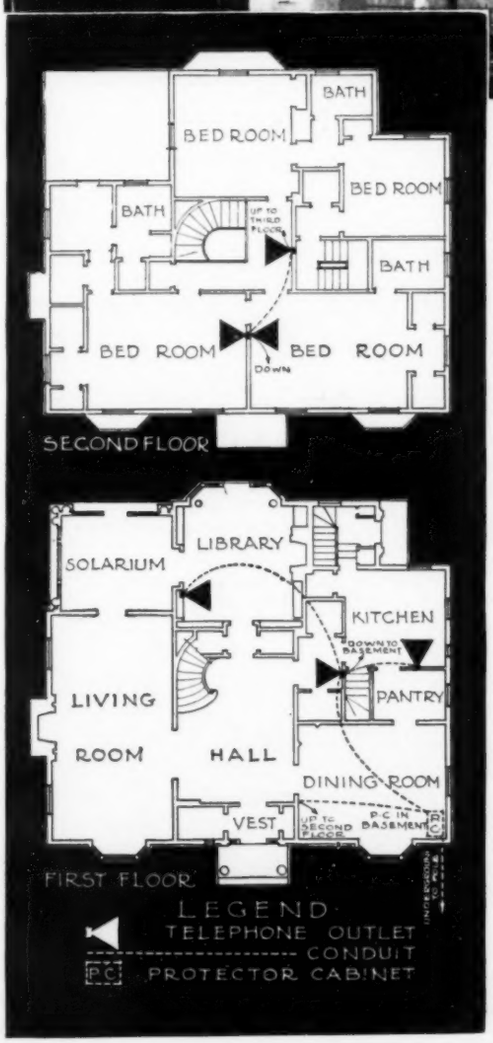
USE THE BEST

Of all the ways of saving money, there is none better than by using the best.

THE DURIRON COMPANY, Inc.
404 N. Findlay Street
DAYTON, OHIO
See Our Catalog in Sweet's

DURIRON
ACID PROOF
DRAIN PIPE

TELEPHONE CONDUIT PROVIDES FOR *TOMORROW*'S NEEDS AS WELL AS TODAY'S



Built-in conduit and seven convenient outlets, including one in the third-floor maid's room, provide for telephone convenience in this well planned residence in Hackensack, New Jersey.
ARTHUR E. DORE, Architect, *Hackensack, New Jersey.*

BUILT-IN telephone conduit and outlets make new or remodeled residences more livable — prevent unsightly exposed wiring — protect against most types of service interruptions.

But their convenience is more than immediate. By careful planning, *extra* outlets can be located at strategic points throughout the house to provide for *future* requirements. Then as children grow up and households expand, the telephone arrangements can be easily extended or revised without the annoyance of messy alterations.

Extra outlets cost little during construction, add nothing to the monthly telephone bill until used, and assure flexible service. They are indicative of a foresight on your part that clients invariably appreciate.

Engineers from your local telephone company will be glad to co-operate in planning conduit layouts for any of your projects. There is no charge. Just call the Business Office and ask for "Architects' and Builders' Service."

REMEMBER TELEPHONE CONDUIT AND OUTLETS IN PLANS FOR NEW AND REMODELED HOMES

1906

MODERN CATALOGING

Published Monthly by SWEET'S CATALOG SERVICE
Division of F. W. Dodge Corporation

1934

Volume 1 AUGUST, 1934 Number 3

BULLETIN BOARD

Said an architect, 'Really it beats
Me to see how an outfit defeats
Its chances to sell
Why on earth don't they tell
All the dope on their products in SWEET'S!'

Of the family dwelling units in the first 42 cities reported in the Government's real property inventory, 10% had no running water; 13% no gas or electricity; 22% no bath tubs or showers; 69% no central heating. The median age of dwelling units was 18 years.

A visitor to a lunatic asylum was approached by an inmate, who begged that his case might be laid before a magistrate and his release obtained.

The visitor promised to take the necessary steps immediately.

"You won't forget?" said the lunatic.

"Oh, no."

"You're sure you won't forget?"

"Certainly not."

As the visitor turned to go, he received a violent kick that landed him in a heap a few feet away.

"That," said the lunatic, "is in case you should forget."

"There is little doubt, therefore, that to revive construction is the most important thing that can be done to promote general recovery."—*Walter Lippmann.*

So numerous and so diversified are the products and services described in manufacturers' catalogs in the 1934 Sweet's File that 123 pages were required merely to *index* them. This important operation, representing weeks of painstaking work, enables you to put your finger instantly on detailed information on any of thousands of products.

Open Season for Investigations

IN SPITE OF ample precedent and convincing evidence there are still some manufacturers to whom the idea of distributing a catalog as an integral part of the Sweet's file appears somewhat radical.

Aside from the very human tendency to resist change, there is often an honest doubt in their minds that a catalog filed in Sweet's can make for more satisfactory and profitable relations with the profession than if distributed individually. They find it difficult to believe that the catalogs which they have prepared with such care and thoroughness (when that is actually the case) will fail to be rewarded by interested attention and use by recipients. Even though they admit the existence of a catalog filing problem in the architect's office, with its attendant wastes, each believes that *his* catalog is the exception to the rule, and that it will be singled out for preservation and use.

★ ★ ★

Every so often, one of the less reactionary spirits decides to check up on the situation. The usual procedure is to conduct a questionnaire investigation.* Some of these are well designed to elicit the desired information; but others are so lacking in this quality that a busy architect might unwittingly convey a wrong impression in his reply.

***Sweet's takes this opportunity to express its appreciation to all who have taken time and trouble on many occasions to answer these inquiries. It has been especially gratifying to see also that they are not disposed of in a perfunctory manner, but that users of Sweet's have shown a willingness to express their ideas on the subject, specifically and at length.**

For instance, a manufacturer with a four-page condensation of his catalog in Sweet's might send you a copy of his complete 24-page catalog with the ambiguous question:

"Would you prefer that we continue to send you our complete catalog or shall we confine our effort to Sweet's?"

Of course you want the complete information and you tell him so. But unless you make it plain that you prefer to have it sent to you filed in Sweet's he will assume your preference to be for a separate catalog. He should have stated his case somewhat as follows:

"We are planning the distribution of a new 24-page catalog. Would you prefer to receive a loose copy or shall we send it to you in the Sweet's file?"

Then there would be no misunderstanding of the question or of the answer.

★ ★ ★

Another example of this ambiguity is found in the question:

"Is it your habit to consult the Sweet's file for catalog information on ————————?"

Now it may happen that the manufacturer in this case issues an unusually valuable catalog which is retained by more than the average number of architects, not because they prefer the separate catalog, but because the information is not completely presented in the Sweet's file. Under these circumstances, your answer might be misleading—unless you take the trouble to explain that it is your habit to consult the Sweeet's file first for all catalog information; that in this instance you have been forced to go elsewhere to supplement the information; and that you would prefer to have it completely presented in Sweet's.

★ ★ ★

The new user of Sweet's may wonder at our apparent presumption in assuming that architect's replies will be favorable. We can only say that our modesty has been carried away in the many landslides for Sweet's which these surveys have precipitated.

Note: This and the other related subjects are discussed more fully in Sweet's Catalog File, 1934, Section A, page 104.

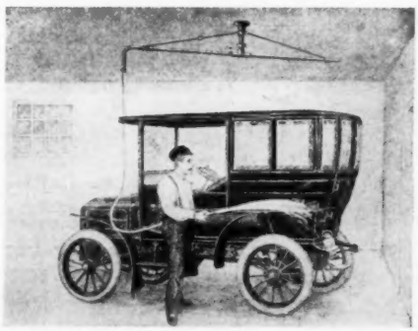
Sweets Consulting Staff

THE members of Sweet's Consulting Staff personally prepared or directed the preparation of many of the most complete and informative catalogs filed in Sweet's.

GEORGE A. CHAPMAN, A.I.A.; educated Pratt Institute; associated at various time with Stevenson & Green, Van Vleck & Goldsmith, Lord & Hewlett, D. Everett Waid and E. L. Margueray; private practice 1908-26 under firm name of Tyrie & Chapman; assisted in organizing The Architect's Small House Service Bureau and for several years, secretary and treasurer of United States Bureau; member A.I.A. Structural Service Committee 1923; organized The Architectural Council 1924, in which acted as consultant to adapt building products to architectural needs, also in formulating catalog material to meet architects' needs; consulting architect for Sweet's Catalog Service since 1926.

An average of 360 families start building, equipping and furnishing new homes every week, each spending $4,000 or more for materials and labor only.

As We Were . . . .



EXCELSIOR WASHER

GARAGE and STABLE EQUIPMENT —1906. A "vehicle washer" is what they called it then—"A practical necessity for all owners of a horse or motor carriage." Thus the manufacturer who used this illustration and copy in his catalog in the first Sweet's file, kept one eye on the future and the other on the past. Straddling two horses is a good trick, but what words can we use to express our admiration for one who successfully straddled a horse and an automobile!

Proved in Service!

HERE'S the 3-year service record of a thousand Scovill Flush Valves. The complimentary letters are typical of the satisfaction expressed everywhere that Scovill materials are installed.

Records of this kind enable architects to specify Scovill Flush Valves with confidence. Whether your client be building or modernizing a house or a skyscraper, you may promise him long, trouble-free performance in the Scovill Flush Valve—proved under such severe service conditions as are met in the three buildings illustrated. For information about this unique flush valve, address the Scovill Manufacturing Company, Plumbers' Brass Goods Division, Waterville, Connecticut.

". . . The 350 Scovill Flush Valves in this building have given us excellent service. Not a single one has been out of order since installation three years ago. No parts have been replaced. A few minor adjustments have been made without shutting off the water. I wish all the equipment in this building gave as little trouble as our Scovill valves. . . ."

Ralph W. Campbell

Chief Engineer
General Electric Bldg., N. Y. C.

Architect: Cross & Cross, N. Y. C.
Plumbing Contractor: J. N. Knight, N. Y. C.

•

"I am pleased to report that since this building was completed in 1931, the 300 Scovill Flush Valves have given perfect service; with no repairs or replacement of parts. Those responsible for the selection of Scovill valves for this building have my sincere thanks for their wise choice in such an important part of the equipment."

Edward Boshka

Building Engineer
Commerce Building, N. Y. C.

Architect: Ely Jacques Kahn, N. Y. C.
Plumbing Contractor: Jarcho Bros., N. Y. C.

•

". . . About 400 Scovill Flush Valves were installed in this building when it was put up in 1931. During the last three years, I have never had to make a repair or adjustment of any kind on them. I can honestly say that these Scovill valves have given better service than any others I have taken care of in my 25 years' experience as a building engineer. . . ."

H. J. Hamill

Chief Engineer
Standard Statistics Bldg., N. Y. C.

Architect: Victor Mayper, N. Y. C.
Plumbing Contractor: Jarcho Bros., N. Y. C.

The Only Self-lubricating Flush Valve. **That's why the Scovill Flush Valve works and wears so well. A lubricant is permanently packed in it . . . for smoother action, longer service. An exclusive feature you won't find in another valve on the market.** NRA

SCOVILL MANUFACTURING COMPANY
PLUMBERS' BRASS GOODS DIVISION
WATERVILLE • CONNECTICUT
Scovill Flush Valves • Shower, Bath and Lavatory Fittings
Miscellaneous Plumbers' Brass Goods

8I

NEW GENERAL ELECTRIC REFRIGERATOR

The newest of its flat top model refrigerators, designed primarily for apartment house installation, is announced by General Electric Company. Being but 37½ inches high, 23⅝ inches wide and 20 inches deep it requires very little kitchen space. Cabinet construction consists of a one-piece steel inner liner and steel outer panels with insulation sealed between. The insulated top of the cabinet is covered with a removable embossed steel panel finished in porcelain. A pressed steel strip finished in black, covers the 4-inch cabinet legs and forms a base in keeping with the modernistic design of the cabinet. Cabinet door and bottom panel are flush with the front of the cabinet. The bottom panel is removable, making the condensing unit easily accessible. The exterior cabinet panels are finished in Glyptal-baked enamel; the interior finish is white porcelain.

8J

A QUARTER OF A MILLION AMPERES

Electrical engineers, who for years have had at their command pressures of millions of volts, now have produced a current that is of the same order of magnitude as that in a severe direct stroke of natural lightning. In the high voltage laboratory of the General Electric Company at Pittsfield, Mass., where man-made lightning bolts of 10,000,000 volts were first attained, the engineers have produced discharges of approximately a quarter of a million amperes. Just as natural lightning, with amperage approaching this figure destroys that which it strikes, so does the laboratory discharge; and just as natural lightning is accompanied by deafening thunder, the laboratory discharges have their ear-splitting crashes that reverberate through the building. The current now available at Pittsfield is being used in the study of ways and means for protection of electric and other equipment against lightning. An interesting discussion on progress in this work is offered by the General Electric Company.

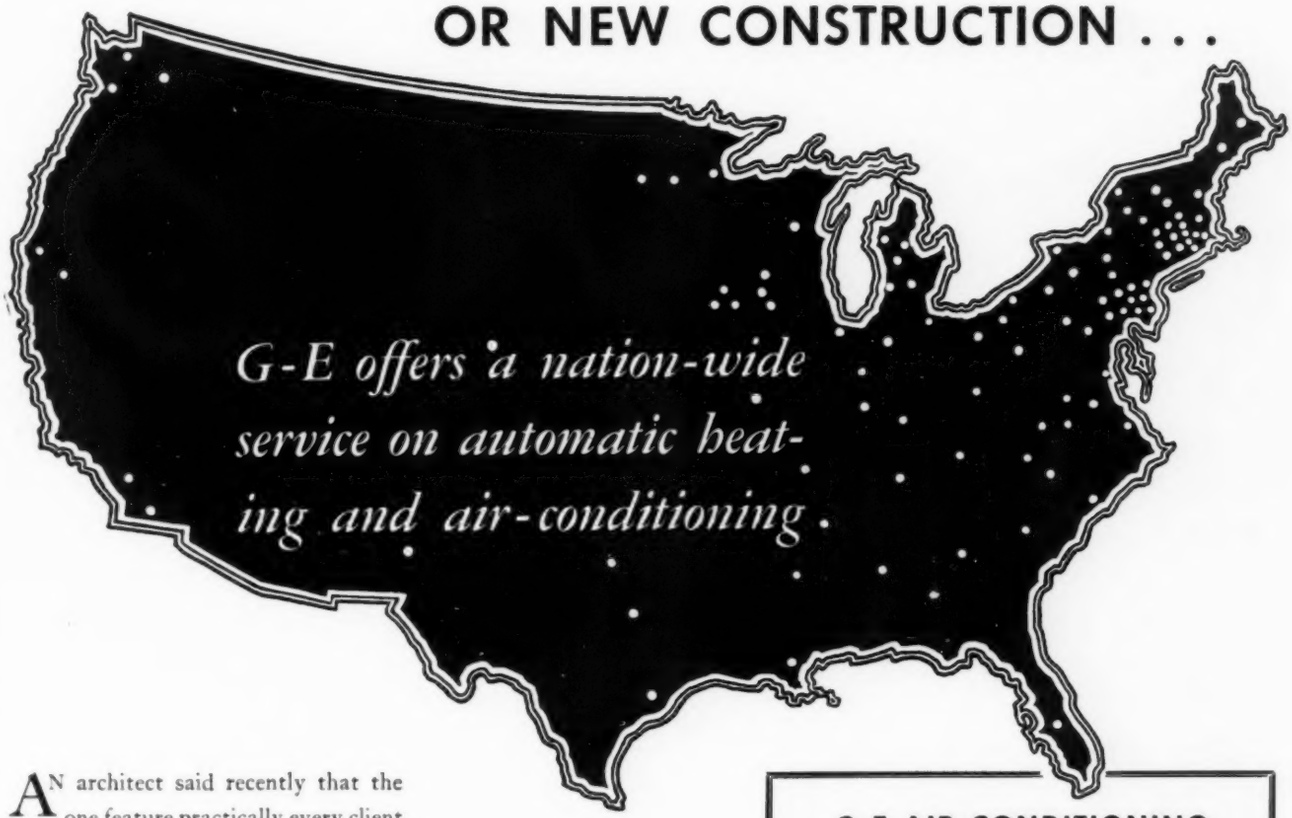
8K

ASBESTOS CEMENT SHINGLES AND SIDING

Folder released by Ruberoid Co. of New York announces opening of a new factory in New Jersey and reviews products manufactured by this company. Eleven products are illustrated in detail and in perspective. Among these are the newest products, Newmarble and Newtile, both of which are asbestos-cement panels, the former simulating marble in appearance, the latter simulating tile.

FOR *Remodeling*

OR NEW CONSTRUCTION . . .



AN architect said recently that the one feature practically every client asks about is air conditioning. No new house, or remodeled one, is really brought up to date unless it includes at least automatic heating.

New developments in both these fields have come so thick and fast recently that the architect must look to some one reliable company for information that he knows he can depend upon—a company with which he has done business in the past on various kinds of building equipment.

General Electric offers you such service. The G-E Air Conditioning Department has a dealer organization that covers the entire country. Each of these dealers has on his staff competent, G-E-trained men with the ability and experience to work right with you on application, installation and on service.

Each dealer has the complete line of G-E air conditioning products—the most complete on the market—including automatic heating with oil or gas fuel, and winter, summer or year round air conditioning.

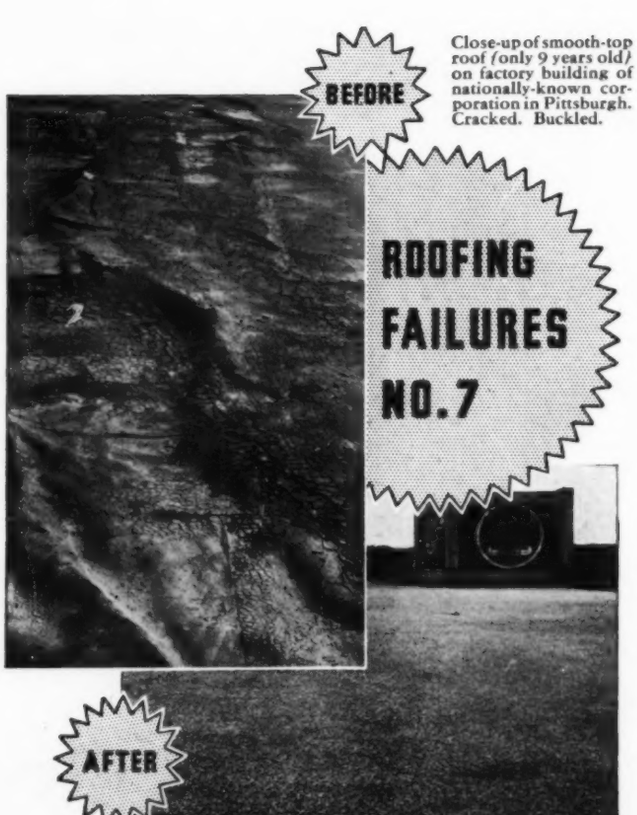
There are units to take care of everything from a single room or single floor to an entire dwelling or larger building. Every unit in the line is G-E designed and made—is sold and installed only by authorized G-E Air Conditioning dealers.

G-E AIR CONDITIONING EQUIPMENTS

G-E Oil Furnace
G-E Furnace for Gas
G-E Air Conditioning System
G-E Air Conditioner for Radiator-Heated Homes
G-E Year-Round Room Air Conditioners
G-E Room Coolers
G-E Store Coolers
G-E Portable Room Cooler
G-E Central Plant Cooling System
G-E Air Circulator

Please feel free to call upon the G-E Air Conditioning dealer in your territory either for personal consultation, or for complete specification sheets and architects' catalogs. This applies whether the job is local or out-of-town. Or communicate directly with us. Address Air Conditioning Department, General Electric Company, 570 Lexington Avenue, New York, N. Y.

GENERAL ELECTRIC AIR CONDITIONING


BEFORE
Close-up of smooth-top roof (only 9 years old) on factory building of nationally-known corporation in Pittsburgh. Cracked. Buckled.
ROOFING FAILURES NO.7
AFTER
Koppers Pitch and Felt Roof which replaced smooth-top roof.

THIS case is typical of hundreds of roofs.

Smooth-top roofing was applied on a flat deck. To prevent water from lying on the flat surface and disintegrating the roofing, the roof was given a pitch with 8 to 12 inches of cinder fill.

In spite of that, the roofing cracked, water entered the cinders, vapor was formed. This ripped up the roofing in great buckles. $2,000 was spent in patching in two years. Finally the roofing and the cinders had to be taken off. Koppers Roofing was applied . . . absolutely flat. No fill needed; no slope; water won't hurt the Koppers Roof. No more trouble on this roof.

FOR ROOFING OR RE-ROOFING, *specify*

1. KOPPERS COAL TAR PITCH
2. KOPPERS COAL TAR SATURATED RAG FELT
3. AND A GRAVEL OR SLAG SURFACE

KOPPERS PRODUCTS COMPANY
KOPPERS BUILDING - PITTSBURGH, PA.
Birmingham - Boston - Chicago — KOPPERS — New York - Providence - St. Louis

OTHER KOPPERS PRODUCTS: Membrane Waterproofing; Dampproofing; Tar Aluminum Paints; Plaster Bond Paints; Tarmac Road Tar for Streets, Pavements, Drives, Highways.

TRADE ANNOUNCEMENTS

THE DURIRON COMPANY, INC.

The Duriron Company, of Dayton, Ohio, manufacturers of acid and alkali handling equipment, have started construction of an extension to their alloy steel foundry doubling the size of the present plant. Additional electric induction furnaces will be installed for the production of "Durimet" and "Durco" Alloy Steels and other chromium-nickel alloys.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

Election of two new directors, the reelection of five directors now serving on the Board and the transaction of routine business comprised the forty-eighth annual meeting of stockholders of the Westinghouse Electric & Manufacturing Company held in East Pittsburgh on April 11, 1934. At the meeting President F. A. Merrick stated: "Orders booked for the first quarter of 1934 totaled approximately $20,100,000. This compares with $12,850,000 for the first quarter of 1933, an increase of almost 57%. The new directors elected were A. L. Humphrey, Chairman of the Board of Westinghouse Air Brake Company, and H. S. Wherrett, President of the Pittsburgh Plate Glass Company.

HOFFMAN SPECIALTY CO.

Announcement is made of the following appointments: Mr. E. A. Davies to the factory at Waterbury, Conn., as a member of the Engineering Department; Mr. A. S. Lindeblad to Mr. Davies' place in the Chicago Hoffman selling organization; Mr. R. L. Lincoln to the Engineering Department staff at the factory in Waterbury; Mr. J. C. Murphy to membership in the Hoffman selling organization. With the addition of the above mentioned new members to the Hoffman staff, and the backing of the most extensive and powerful advertising campaign placed behind Hoffman Specialties in many seasons, the company is looking forward to the largest volume of business in several years.

ILLUMINATING ENGINEERING SOCIETY

A. L. Powell, Manager of the Eastern Office of the Nela Park Engineering Department of General Electric Company, has been elected President of the Illuminating Engineering Society for the year 1934-'35, according to announcement by that organization. He succeeds J. L. Stair, Chief Engineer of Curtis Lighting, Inc., Chicago. An internationally known authority on illumination design and application, Mr. Powell has been a pioneer in the fields of architectural, decorative, and other modern forms of lighting. He has prepared numerous papers and articles on these subjects which have appeared in general and trade publications.